CHNOLOGY DEPT.

FLIGHT

MAGAZINE

AUGUST 1953
35 cents

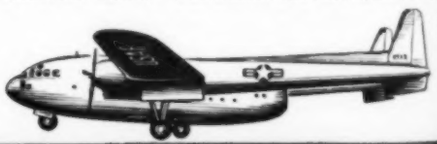
RILEY TWINS ROLLING FROM TEMCO LINE

FRONT LINE DELIVERY FOR ADVANCE BASE SUPPORT

Shuttling between major air terminals is one type of operation . . . like the Berlin airlift, in which Fairchild "Flying Boxcars" moved hundreds of tons of cargo. More eloquent of the C-119's versatility is the urgent shuttling of supplies from rear areas to *advanced combat bases*. Here the famous "Flying Boxcar" is unique. No other aircraft can load so much materiel *intact* . . . to unload it, ready for action, on an emergency field . . . or to paradrop it where no air-strip exists. Designed and constantly improved to meet expanding military needs, the C-119 delivers men, supplies and equipment with maximum speed and efficiency. From nose to twin-tail it's a specialized bulk cargo carrier—ready for *any* airlift, *from* anywhere *to* anywhere!

EXCLUSIVE FEATURES FOR ADVANCE BASE OPERATIONS:

Increased payload • Better bulk Cargo Clearance and Distribution • Shorter Take-offs and Landings • Rough Field Landing Gear • Crew Bail-Out Chute • Provision for External Fuel



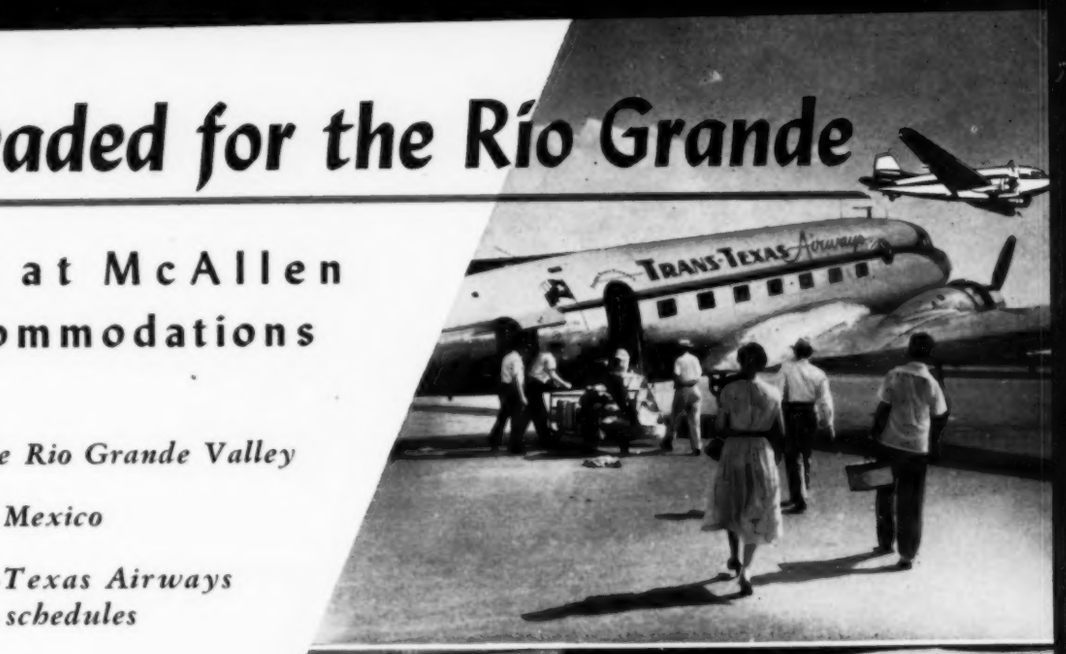
ENGINE AND AIRPLANE CORPORATION
FAIRCHILD
Aircraft Division
HAGERSTOWN, MARYLAND

Engine Division, Farmingdale, L. I., N. Y.
Guided Missiles Division, Wyandanch, L. I., N. Y.

If you're headed for the Rio Grande

Miller Field at McAllen Is Tops in Accommodations

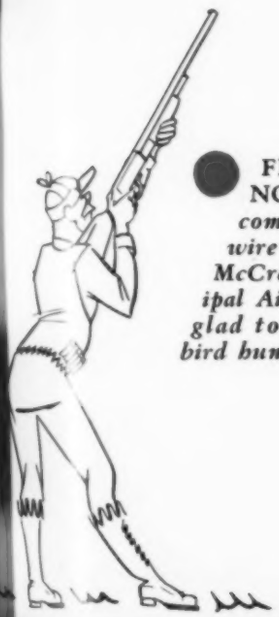
- *It's in the heart of the Rio Grande Valley*
- *It's a Port of Entry to Mexico*
- *It's served by Trans-Texas Airways with convenient daily schedules*



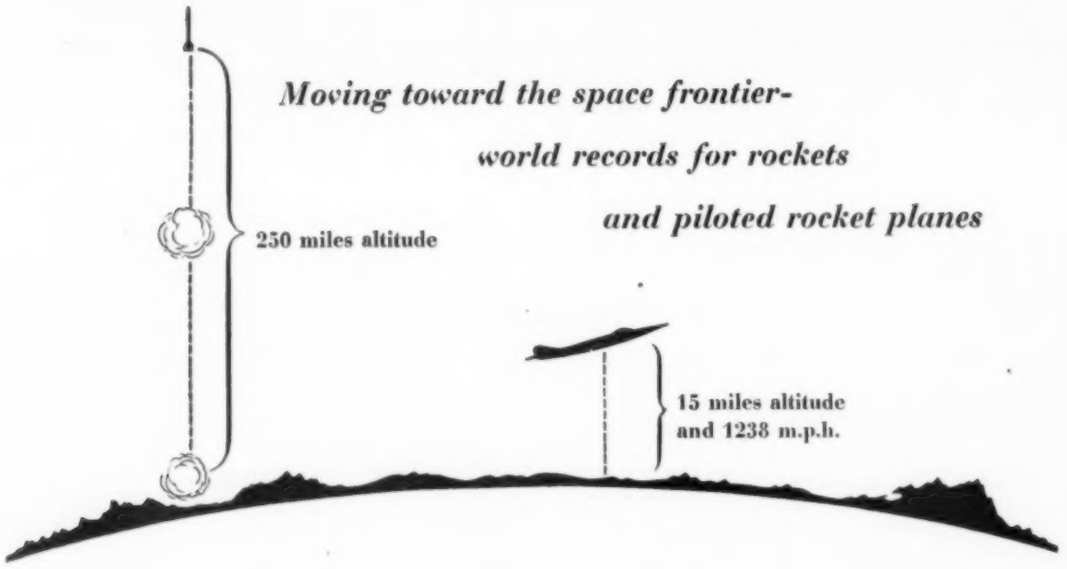
IF YOUR'E IN YOUR OWN PLANE

Miller Field is lighted, has ample paved runways, and at McCREERY AVIATION you'll find a friendly welcome from "Mac" and Ardath McCreery. At McCreery's there's top-flite storage and maintenance service with licensed mechanics and ready transportation to town. There's Mobilgas Aircraft and Mobiloil Aero, too. If you'd like anything special (like a rent-a-car), call 'em on the Unicom(122.8)before you land and they'll have it ready for your arrival.

If you're going airline, Trans-Texas serves the valley with fast, convenient schedules. If you're flying your own, "Mac" and Ardath McCreery are there to welcome you to McCreery Aviation. If you're within the radius (50-60 miles) call 'em on the Unicom(122.8)and let 'em know you're coming in.



FLYING BIRD-HUNTERS PLEASE NOTE: ***The white-wing hunting season comes off at McAllen in September. Call, wire or write J. F. "Mac" McCreery at McCreery Aviation Company, Miller Municipal Airport, McAllen, Texas, and he'll be glad to give you dates and details on real bird hunting.***



Moving toward the space frontier-

world records for rockets

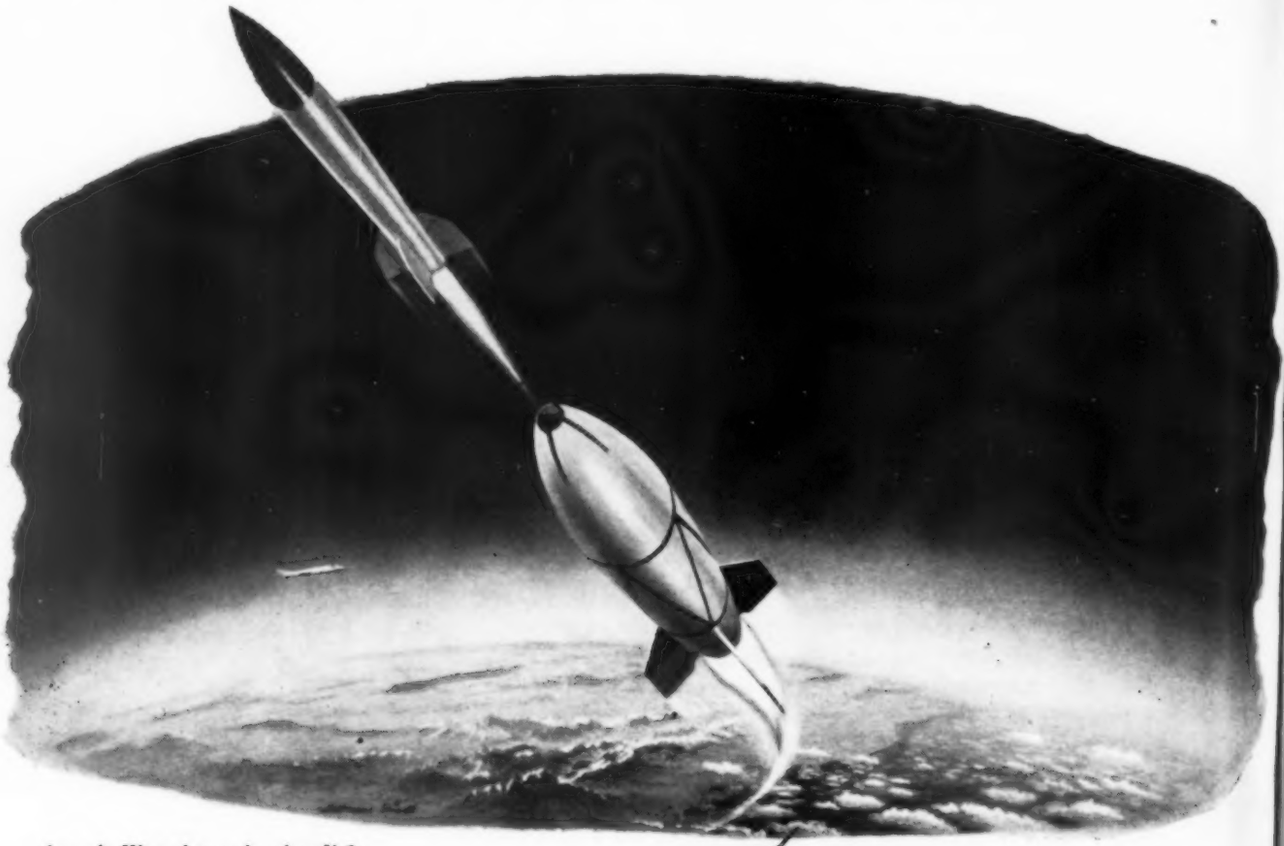
and piloted rocket planes

—the Douglas Skyrocket and Wac-Corporal

How soon will man cross the Space Frontier? Already, Douglas-built planes, rockets, and missiles—including the Wac-Corporal and D-558-2 Skyrocket—have probed at its fringes.

In a record climb, the Douglas D-558-2 reached an altitude where its pilot was *weightless*, as in a flight through space, while the Wac rocket, set in the nose of the V-2, travelled one-quarter of the way to the proposed orbit of a man-made satellite. Most important, both records came during *normal research*—planned to keep the United States and its Armed Forces out in front in the fields of guided missiles and supersonic aircraft.

Performance of Skyrocket and Wac-Corporal is proof of Douglas leadership in all phases of flight. *Farther and faster with a bigger payload* is the basic rule of Douglas design.



Army's Wac shown leaving V-2

Depend on *DOUGLAS* **First in Aviation**

ANOTHER REASON ALLISON LEADS IN THE AIR

An Allison Technical School instructor leading class discussion on the J35 Turbo-Jet engine.

Training the men behind the men who fly the jets

Around the world there is an ever-growing fraternity of mechanics, engineers and instructors who have earned the title, "Allison Technical School Graduate." More than 10,000 members of the Air Force, Navy and Marines have received diplomas from the Allison Technical School, in Indianapolis.

Students selected by the Armed Forces are usually engineering officers or enlisted personnel with long years of service. They are sent to the school for intensive 4-week courses which involve long hours in the classrooms and extra hours of homework every evening.

Skilled Allison instructors with many years of varied experience make use of modern teaching aids including cutaways of J33 and J35 Turbo-Jet engines, the T38 and T40 Turbo-Prop engines.

But the activities of the Allison Technical School do not stop with the classes at Indianapolis. In addition, Allison instructors from the school go out all over the world to set up classrooms at air bases and aircraft manufacturing plants to teach thousands of other technicians the proper methods of operating and maintaining Allison turbine engines. These men include pilots, flight engineers and technicians from aircraft builders and our own organization.

Yes, thousands of the men behind the men who fly the jets proudly wear the badge, "Allison Technical School Graduate."

GM GENERAL MOTORS

Allison DIVISION OF GENERAL MOTORS, INDIANAPOLIS, INDIANA

World's most experienced designer and builder of aircraft turbine engines—J35 and J71 Axial, J33 Centrifugal Turbo-Jet engines, T38 and T40 Turbo-Prop engines

TRAIL-BLAZER OF THE STRATOSPHERE!

Wiley Post, the beloved one-eyed Oklahoman, seemed to have many of the prairie qualities of the man with whom he died, Will Rogers. Wiley Post was the first man to fly around the world alone . . . the first man to fly around twice. He was an early student of high altitude jet streams and he worked tirelessly to promote his theory that "the air lanes of the future will be charted through the stratosphere."

PHILLIPS Petroleum Company sponsored many of Wiley Post's experimental stratosphere flights during the mid-thirties. For his high flying, a rubberized fabric "space suit" was used by Post to protect him from the dangerous effects of high altitudes. Shown here are Post (left) and Will D. Parker, Manager of Phillips Petroleum Company's Aviation Division, standing beside Post's plane "The Winnie Mae," examining the inflated suit in preparation for one of the high altitude flights. On the extreme right is Guy Ball, parachute expert.

THE LATEST high altitude pressure suit, shown above, was developed for the U. S. Navy by B. F. Goodrich Company. For the first time pilots can now abandon jet or rocket aircraft in outer space atmospheres. Life can be safeguarded as high as 100,000 feet in the new high altitude suit, designed to inflate automatically to survival pressures should a plane's pressurized system fail. This innovation in outer space attire stems directly from that first "space suit" worn by Wiley Post—and made for him by B. F Goodrich.

Virtually every phase of American industry has had a hand in the remarkable progress and growth that aviation has undergone. In the field of aviation fuels and lubricants Phillips Petroleum Company has been, and continues to be, a major contributor.

Today Phillips is one of the country's largest suppliers of aviation fuel for military, commercial and private flying. Producing new fuels for turbo-props and jets, Phillips also supplies great quantities of 115/145 grade aviation gasoline.

For the very finest in aviation fuels and lubricants think first of Phillips.

AVIATION DIVISION
PHILLIPS PETROLEUM COMPANY
BARTLESVILLE, OKLAHOMA

Phillips 66

AVIATION PRODUCTS

1903 50TH ANNIVERSARY OF THE AIRPLANE 1953

AIR Report
Significant Trends and News

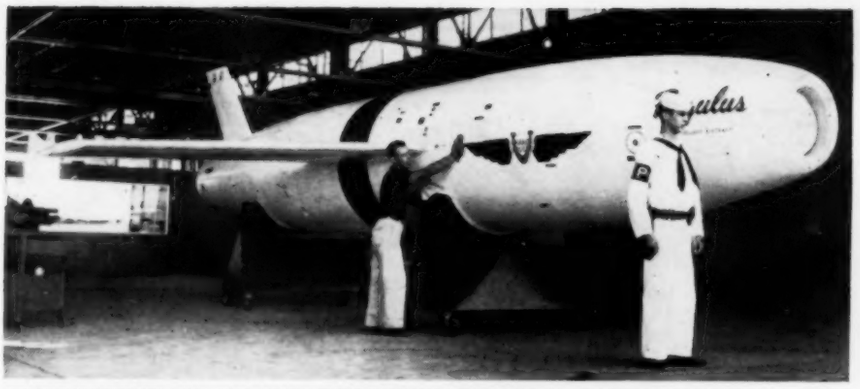
STATUS REPORT ON NEW AIRCRAFT: The second Piper Twin "Apache" will be delivered to the Piper sales department shortly after Labor Day for flight demonstrations. Among the refinements of the newer all-metal ship over the prototype are specially designed engine nacelles (designed in Detroit). . . . Jacobs Aircraft Engine Company of Pottstown, Pennsylvania, will test fly its experimental helicopter in August. . . . Associated Manufacturing and Engineering Company's WE-1 Navion conversion using two E-225 horsepower Continental engines has completed CAA approved type certificate static tests and will undergo flight ATC tests after a cross-country shakedown flight in August. The company has started conversion work on their second Navion. (See pages 22-23 of this issue for complete story). . . . Sanders Aviation Company of Riverdale, Maryland, is contemplating manufacture of the 4-place airplane the Ercoupe manufacturers dropped in 1947. With prototype, all engineering and drawings, plus many tools and fixtures in hand, Sanders hopes to acquire necessary capital and manufacturing facilities in the near future. They believe the airplane can be sold in volume of 200 per year or more for under $10,000.

HILLER ACQUIRED RIGHTS TO 8-PLACE DOMAN YH-31 HELICOPTER in a licensing agreement closed late in July. Details of the deal were not disclosed, but Doman will continue development of civilian helicopters while Hiller will be concerned with military interests in the 400-hp. single-engine transport helicopter, now undergoing CAA certification tests at Danbury, Conn.

LIGHTPLANE DELIVERIES BY SIX MANUFACTURERS DURING FIRST 5 MONTHS OF 1953 totaled 1,776 with total billings of $15.1 million, according to the Aircraft Industries Association. This is at an average of 355 lightplanes per month valued at slightly over $3 million. If this average is maintained throughout the rest of the year, 1953 lightplane shipments will total 4,260 with a value of $36.3 million, as compared with 3,058 deliveries worth $26.1 million in 1952 and only 2,302 deliveries valued at $16.8 million in 1951. The outlook is for 1953 lightplane shipments to exceed last year's by about 40 per cent.

LARGEST NUMBER OF LIGHTPLANE SHIPMENTS during first 5 months of 1953 was 866 sold by Piper, including 439 Super Cubs and 427 Pacers and Tri-Pacers. Their value of

(*Continued on page* 10)



FIRST CLOSE-UP OF CHANCE VOUGHT "REGULUS" GUIDED MISSILE is this view photographed on public display during the Michigan Aero Club's 6th Annual International Aviation Exposition last month in Detroit. Not shown is the landing gear of the Regulus, which resembles a jet fighter plane. This supersonic missile is in production for the Navy at Dallas.

—(Chance Vought Aircraft Photo.)

FLIGHT MAGAZINE

Including SOUTHERN FLIGHT and MODERN AIRPORTS

AUGUST, 1953 VOL. 40, No. 2

COVER: Temco production of Riley Twin Navion Conversions for Jack Riley began rolling in high gear last month. Shown on the cover are 8 Riley Twins on the ramp and a 9th flying down the line-up. Nearest to camera is Riley's Series 300 model, powered by two newly-developed 4-cylinder Lycomings producing 150 hp. each and equipped with exhaust augmentor tubes and propeller spinners. Riley has now completed 20 Twins powered by 140-hp. Lycomings. Beginning with No. 21, all will be delivered with the new 150-hp. engines. Customers represented by the airplanes pictured on the cover are General Tire Co., Akron, Ohio; Russell Firestone, Jr., Dallas; Ireland Coal Co., Cleveland, Ohio; Red River Cotton Oil Co., Alexandria, La.; M. L. Mayfield, Houston; Ben Bransom, Dallas; Burrus Mills, Dallas; and Johnson Lumber Co., Omaha, Nebraska.

—(FLIGHT MAGAZINE Photo.)

Air Report—SIGNIFICANT TRENDS AND NEWS - - - - - - - - 7

Just Among Ourselves—EDITORIALS: SERVING THE BUSINESS FLIERS; OAKS FROM ACORNS - - - - - - - - - 13

A Temco Design Study—A SMALL, FAST, PRESSURIZED TURBOPROP TRANSPORT OF INTEREST TO EXECUTIVE PILOTS - - - - 16

Wings for Highway Safety—BY TOM ASHLEY—HOW AIR PATROL HAS REDUCED HIGHWAY ACCIDENTS IN MISSOURI - - - - - 18

Success With a Flight School—BY E. H. PICKERING—BUSINESS IS GOOD FOR THIS OPERATOR, WHO RAN $37 UP TO $35,000 - - 20

The WE-1 Navion Conversion—BY GEORGE E. HADDAWAY—DETAILS OF A TWIN NAVION CONVERSION USING TWO 225-HP. CONTINENTALS - - - - - - - - - - 22

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GEORGE E. HADDAWAY, Editor-Publisher; TOM ASHLEY, Managing Editor; FRED N. STONES, JR., Business Manager, P. O. Box 750 (1901 McKinney Ave.), Dallas, Texas—Telephone STerling 2125.
EASTERN ADVERTISING MANAGER: ELLIOTT J. FARRELL, Room 443 Chanin Building, 122 E. 42nd Street, New York City—Telephone Oxford 7-1973.

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The Beechcraft Bonanza

FOR VALUE

Enjoy outstanding design features and performance

. . . the 1953 Bonanza has been refined to matchless perfection and from any angle it's the finest, most practical design in a personal plane. The new Bonanza for 1953 offers speed **with** safety . . . power **with** ease of flying . . . all-metal durability **with** roomy comfort and combines many other advanced design features that make it years ahead in its field. The 1953 Bonanza is truly the design of the future here today.

With full tanks, the 1953 Bonanza's payload is 822 lbs., or four persons plus 142 lbs. of baggage. Useful load is 1,075 lbs.—enough to meet all your requirements. Also, the new Bonanza's performance includes 175 mph. at 8,000 ft. using 65 per cent of power (120 hp.) with fuel consumption at 10 gals. per hour. Combine this with the Bonanza's big payload and you have unequalled performance.

You will find owning a Beechcraft is a paying business proposition. A phone call or a note on your letterhead is all that is necessary for a free demonstration by the J. D. Reed Company, Houston, Texas.

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P7-B*
P9-B*

PIONEER Guide Surface Personnel Parachutes

less
opening shock
less
oscillation
less
side drift
jumper descends
straight down
landing on his feet

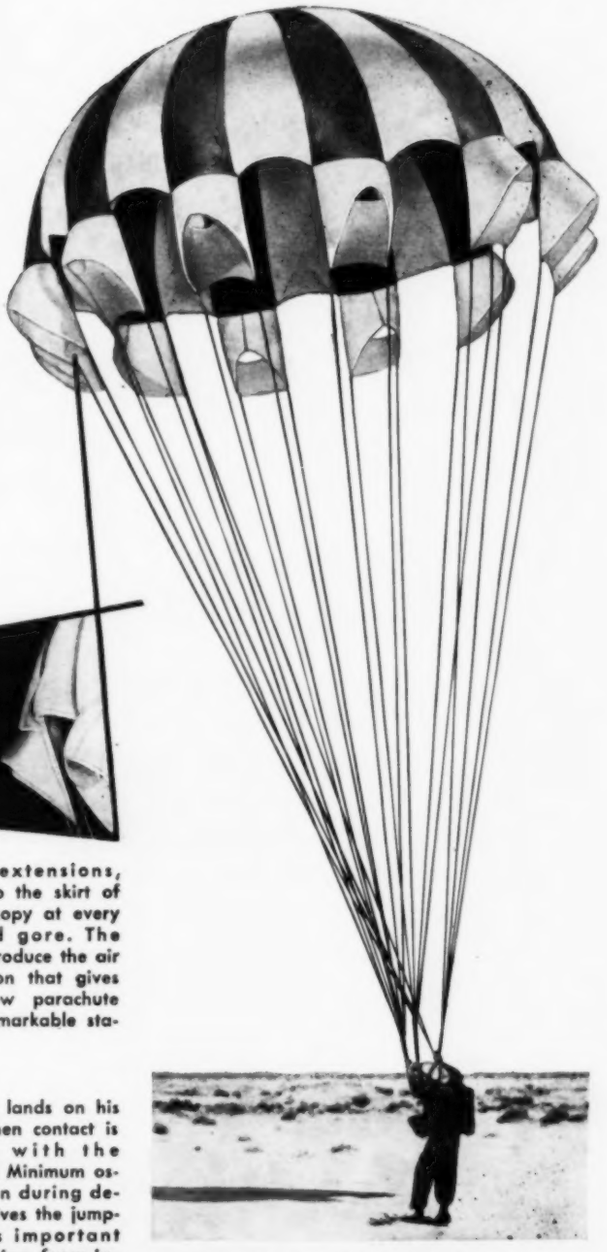
Jumper clears plane and pulls ripcord.

Pilot chute begins to draw canopy out of the pack.

The canopy has begun to open.

Canopy swings to a vertical position.

Jumper descends straight down.



Once again, Pioneer Parachute Company's manufacturing facilities, as well as its development and engineering experience, work for the advancement of the aviation industry. The Pioneer P7-B* and P9-B* Guide Surface Personnel Parachute now makes more certain the saving of lives during emergencies at higher aircraft speeds — and safer than ever before in the history of aviation.

The Guide Surface Personnel Parachute is now standard equipment of the U. S. Air Forces and is available, through the Pioneer Parachute Company, to other governments and commercial flyers.

• SOUTHWEST FACTORY BRANCH
Love Field, Dallas, Texas

PARACHUTES MAKE THE DIFFERENCE!

Guide extensions, sewn to the skirt of the canopy at every second gore. The vents produce the air deflection that gives this new parachute such remarkable stability.

Jumper lands on his feet when contact is made with the ground. Minimum oscillation during descent gives the jumper this important protection from injuries.

Patents applied for in U.S. and principal countries throughout the world.

PIONEER PARACHUTE CO. INC.
MANCHESTER, CONNECTICUT, U.S.A.
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CONTINENTALS are Engineered to Excel

THAT IS WHY THEY POWER MORE

UTILITY AIRCRAFT

THAN ALL OTHER ENGINES COMBINED

SERVICE EVERYWHERE

YES—ONLY CONTINENTAL BACKS YOU WITH ESTABLISHED WORLD-WIDE SERVICE

Continental Motors Corporation
Aircraft Engine Division
MUSKEGON, MICHIGAN

AIR REPORT

(Continued from page 7)

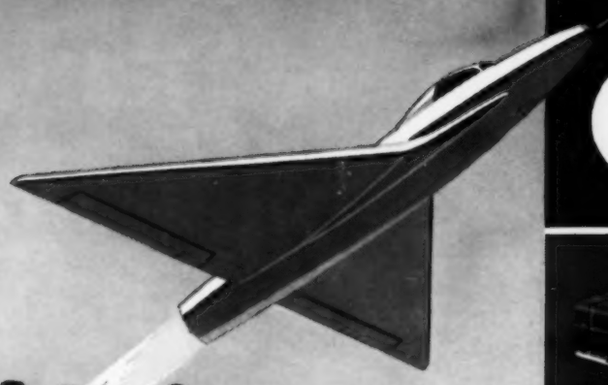
$3,679,000, however, was below the $5,662,000 worth of 696 airplanes delivered by Cessna, including 377 Model 170B's, 261 Model 180's, 52 Model 195's, 5 Model 190's and 1 Model 140A. Beech delivered 170 airplanes (145 Bonanzas and 25 twin-engine D18S transports) valued at $4,149,000. Aero Commanders numbered 27 through May, with a value of $1,587,000, and Taylorcraft shipped 11 Tourists and 3 Sportsman models valued at $70,000, while Mooney delivered 2 M-18 single-seaters and Call-Air delivered 1.

A CESSNA 180 STAYED ALOFT 10 HRS. AND 14 MINS. on July 11 as part of the 6th Annual International Aviation Exposition at Detroit, averaging 4.4 gals. per hour for fuel consumption at an average true air speed of 110 mph. Flown by Robert Nulty, Cessna distributor in the Great Lakes area, and his salesman Landy Taylor, the 180 had no modifications and carried the regular 60-gal. capacity. The flight was under a CAA flight plan filed at 5:44 a. m. and closed at 3:58 p. m. with the landing. It was estimated that the flight covered 1,200 miles, although it was made locally.

LOOKING TO 1955-56 BUSINESS, Temco Aircraft Corp. at Dallas is placing primary emphasis on developing aircraft designs of its own for the military services combined with subcontracting major assemblies for other manufacturers. President Robert McCulloch said Temco had negotiated arrangements to produce several major assemblies for the McDonnell F3H Demon amounting to about 35 per

(Continued on page 26)

FLYING SALESMAN Bob Darlington, vice president of Whiton Manufacturing Co., New Britain, Conn., services accounts in cities from New York to Chicago in his Cessna 170. He sells precision grinding spindles and says he can make more calls in less time by flying—as do thousands of businessmen engaged in modern flying.



Leadership in fuel metering...

FOR JET, RAM JET AND TURBO-PROP ENGINES

Since the first jets of World War II, Bendix Products Division at South Bend has served the aircraft industry in developing and manufacturing fuel metering systems for jet engines. Today Bendix offers unmatched know-how and facilities both in electronic and hydro-mechanical principles for these important components of jets, ram jets and turbo-prop engines.

RESEARCH • A staff devoted exclusively to seeking new and better fuel metering techniques — preparing today for the requirements of tomorrow.

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EXPERIENCE • A background of more than thirty years of leadership in designing and building fuel metering systems for both reciprocating and jet engines.

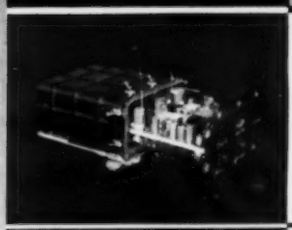
For Your Fuel Metering Requirements Depend Upon Bendix:

• Hydro-mechanical fuel controls • Afterburner controls • Fuel supply pumps • Spray nozzles
• Electronic fuel controls • Turbo-prop controls • Flow dividers • Ram jet controls

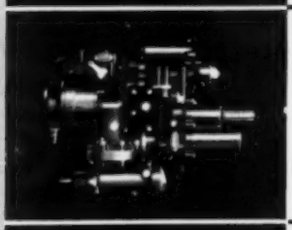
BENDIX PRODUCTS DIVISION **SOUTH BEND** INDIANA

Bendix AVIATION CORPORATION

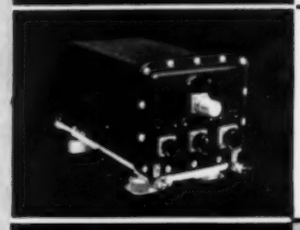
electronic



ELECTRONIC CONTROL Senses engine speeds, gas temperatures and other control factors — then signals fuel requirements to the fuel metering unit.

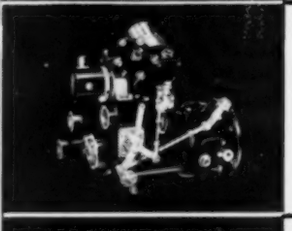


FUEL METERING UNIT Electrically controlled, this unit meters fuel to the engine in accord with signals from the electronic control.

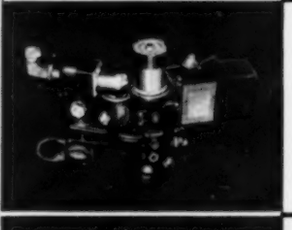


ELECTRONIC AMPLIFIER Maintains a scheduled exhaust turbine temperature by controlling the nozzle area.

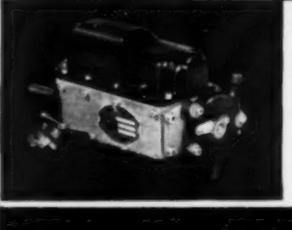
hydro-mechanical



MAIN FUEL CONTROL The control illustrated includes a governor which holds the engine at a selected speed regardless of altitude.



AFTERBURNER FUEL CONTROL Graduates the afterburner thrust by selecting fuel flow in various proportions to mass air flow through the engine.



NOZZLE CONTROL A hydro-mechanical servo control unit which actuates the variable exhaust nozzle mechanism of a jet engine.

Bendix Products Division

ELECTRONIC AND HYDRO-MECHANICAL CONTROLS

Export Sales: Bendix International Division
72 Fifth Avenue, New York 11, N. Y.

OPPORTUNITIES FOR ENGINEERS in Electronics, Mechanics and Hydraulics — This division of Bendix is among the world leaders in developing and manufacturing a wide variety of products currently in use by commercial as well as military aviation. Investigate your opportunities with Bendix. Write to Administrative Engineering, Bendix Products Division, Bendix Aviation Corporation, South Bend. Ind.

Facts *and figures!..*

Figure:

Now, cloud-clobbering classmates, gather 'round and we'll show you the difference between a lure and allure. Obviously, Rosemary Gowen (21, 118 lbs., 5'7", brown hair and eyes) has both. She has hooked herself with one, while reserving the other to angle for, say, a bass-voiced flying fish at the beautiful concrete beach of Southwest Airmotive in Dallas.

Fact:

For hundreds of pilots throughout the Western Hemisphere, there's allure aplenty in the quality, dependability, and reasonable prices of the Southwest Airmotive Instrument Shop. Recently expanded and newly-equipped, this shop can do everything from setting a clock to custom-building a complete executive aircraft panel. Write for details and prices.

Southwest Airmotive COMPANY
LOVE FIELD | DALLAS

Just among ourselves

EDITORIALS

SERVICING THE BUSINESS FLIERS

THERE'S a peculiar philosophy among a number of pilots of executive aircraft and business fliers that wherever they land for gas the airport service operator should roll out the red carpet, sweep out the ship, clean the windshield, empty the ashtrays, arrange for hotel accommodations, furnish transportation to town, then tie the airplane down (if hangar space isn't available)—all for free. And if gasoline is purchased in any quantity at all, a discount is usually expected.

On the other hand there are those in the operating and sales end of the business who want to start a national campaign to convince airplane owners that they should not attempt to chisel on prices, that "discount-itis" weakens the entire aviation servicing structure and eventually will result not only in generally poorer service but also in less service since the practice of chiseling brings on bankruptcy.

Both of these views are extreme but nevertheless actually exist. The situation calls for a broader understanding between the customer and the airport service institution of each other's problems to the end that both profit mutually from every business transaction. But both groups might as well face it — the operators can't stop pilots and plane owners from seeking discounts or expecting a lot of service for little or no reward and the plane owners are not going to get a lot of fancy service out of an operator who simply pumps a little gas into an airplane or unjustifiable discounts from those who want to stay alive. Therefore any friction between the two is a little on the ridiculous side.

One of the roots of such trouble often lies in the home office of the corporate aircraft owner. Executive pilots of large corporations are either caught in or imagine they are caught in the difficult position of saving money wherever they can in the servicing and maintenance of their flying equipment. A lot of so-called chiseling originates between the pilot and the operator because the pilot wants to run back to his downtown office and show the boss how much dough he saved the company to help justify his own job. It is an amusing paradox to say the least to observe a large company paying a hundred thousand or so for an executive transport, then trying to chisel the lowly operator on gas and maintenance, or to hire competent pilots on starvation wages.

We think the executives of the companies owning the airplanes are the ones who need educating. Nothing would be more ridiculous than to try and change human nature, which some observers concerned with the problem propose to do, but you can change the attitudes and practices of hard-headed businessmen when it's done on a hard-headed business-like basis. Trouble is no one takes the time to talk to the men with the purse strings.

Fortunately the majority of corporation aircraft owners know that you get exactly what you pay for. In recent years more and more of them have learned that safety is a dollar mark — you just can't treat an airplane like a truck or an automobile or dragline, and compromise with cheapness. For those who haven't learned the lesson yet we might try an intelligent, industry-sponsored educational program. But it's a waste of

(Continued on page 37)

OAKS FROM ACORNS

NEW York Airways, one of the nation's three certificated "experimental" helicopter operations, last month started hauling passengers commercially between the three large metropolitan New York airports — LaGuardia, Idlewild and Newark. Fares are equivalent to taxi charges between the terminals. Between Idlewild and Newark ground time consumes about 2 hours while the helicopter makes it in 20 minutes. That's real progress and from where we sit it looks like inauguration of scheduled helicopter passenger service in the New York area should be considered one of the major aeronautical achievements of 1953.

It was only 14 years ago that the first production-type helicopter took to the air. And it was only 7 years ago that the first commercial model went into production. Since that time the 'copter industry has produced 2,800 machines, mostly for the military services. While the Korean War has contributed much to helicopter development we cannot lose sight of the commercial utilization of helicopters and the terrific potential for the machines in peaceful pursuits.

Although military orders and military utilization have speeded up development, these factors simultaneously have retarded the marketing of helicopters in the commercial field. What few helicopters are now in commercial use were largely bought, not sold. Just before the war broke out in Korea it looked as if we would see some concentrated and intelligent sales promotion work on the part of several manufacturers. The Korean war quickly shelved that development.

It now appears that several helicopter companies are again considering marketing their products commercially, putting some sustained steam behind their efforts. Surely the inauguration of passenger service by New York Airways with 16 daily schedules will help influence public acceptance of the helicopter nationally. It comes at an opportune time when a young but healthy branch of our domestic aviation enterprise stands on the threshold of expanding into virgin commercial markets.

We salute New York Airways on occasion of their first passenger operations. Only 12 people bought tickets the first day, but from such little acorns grow the mighty oaks of profitable commercial enterprise. Pioneering in 1953? Certainly! Who says that opportunity is dead? ★ ★ ★

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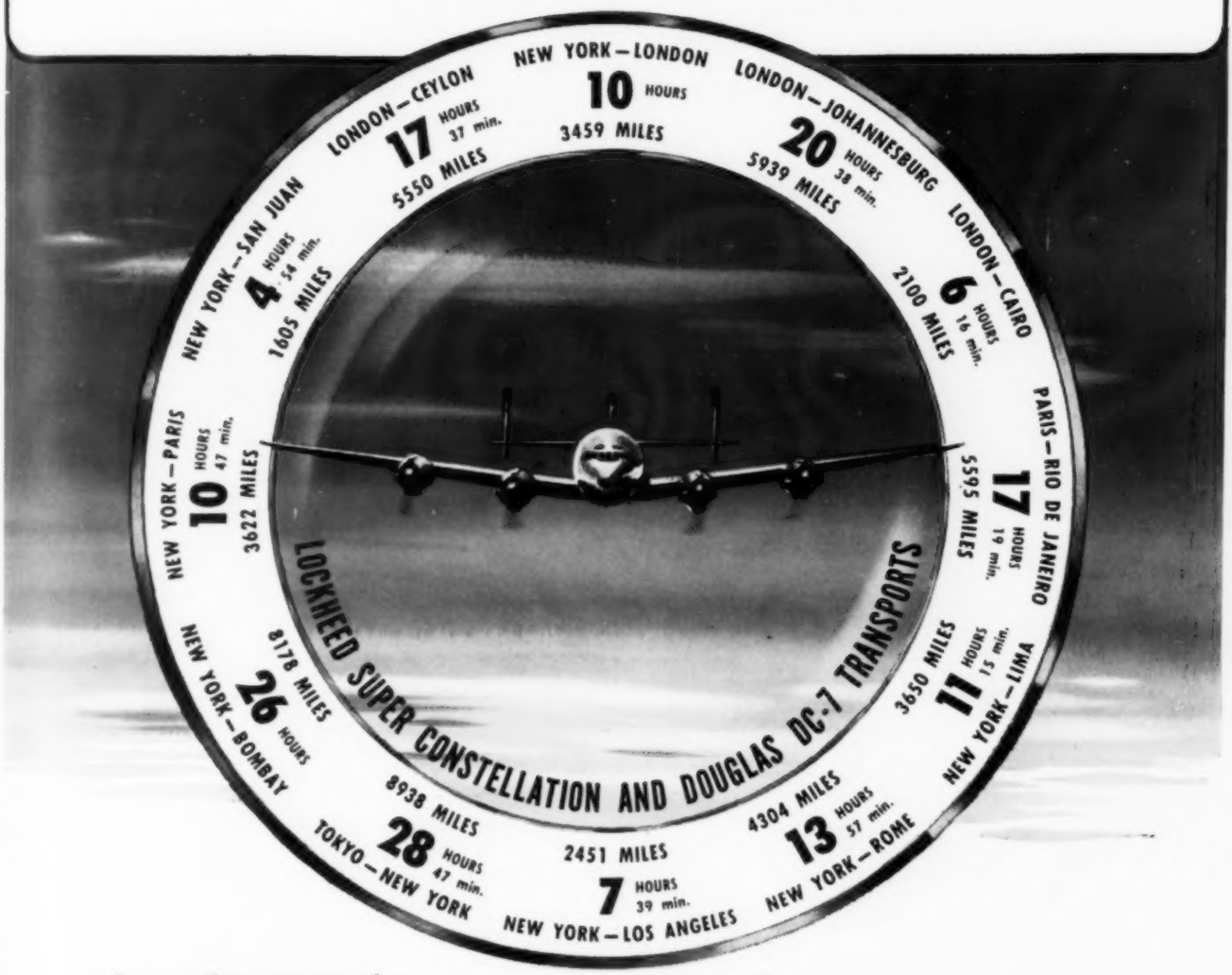

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A Temco Design Study

Here's a trend in small, fast, pressurized transports of interest to executive pilots

PROSPECTS have been hopeless in recent years for new designs in high-performance executive aircraft in the category above 300 mph. Because military and airline requirements have dominated industry activities and interest, executive transport users have gone to interesting and costly extremes in their widening search for performance. Numerous examples of this have been reported in FLIGHT MAGAZINE—including "super" conversions of war surplus airplanes such as the Douglas A-26, Martin B-26, North American B-25, Lockheed Lodestar and Douglas C-47 projects. A few Convair 340's from airline production have gone into executive flying.

But where and when will these users who fly more hours and travel more distance annually than all the domestic airline transports combined, find available a modern aircraft design offering the advantages of engineering achievements made possible by jet power? Within recent months, several manufacturers have let word out to the effect that they were "studying" the possibility of projects which could be useful to executive fliers.

One of these is Temco Aircraft Corporation at Dallas, now a major factor in aircraft engineering and production. Temco has recently participated in industry-wide competitions for new military aircraft types with designs of its own. One of these is a trainer and another is a day fighter—both are jet powered. In the process, Temco conducted very exhaustive investigations with turbo-prop engines, with special interest and emphasis centered on the Armstrong Siddeley "Mamba" turbine-propeller engine in production and use in England.

Last month President Bob McCulloch of Temco revealed his engineers had made a design study of a light transport powered by two Mambas and that the design had possibilities of being adapted to executive aircraft needs. While McCulloch emphasized that Temco had no intention at present of producing the design for the commercial market—it may never go beyond the paper-work design study stage in his engineering department—the fact that his engineers are cognizant of executive transport needs is significant news. It indicates that the demand for high-performance executive transports has at last attracted the attention of aggressive elements in the industry, even though McCulloch and his engineers point out that they doubt the demand is sufficient to economically justify going into production on a new jet-powered transport designed for executive use. Temco and other manufacturers are heavily committed to military requirements at the present and this would handicap any attempt to undertake a multi-million-dollar commercial design project.

With this background in mind, the Temco drawing on the opposite page should be regarded for what it actually is—a "paper" airplane and nothing more at this stage.

Briefly, Gus Erickson, chief engineer for Temco, describes it as light turbo-prop transport with pressurized cabin. It is designed to cruise above 30,000 ft. at speeds faster than 300 mph. and with fuel economy comparable to that of transports powered by piston engines. The advantage in turbo-prop power is in smaller engines requiring nacelles of very small frontal area and lighter weight for the high power output needed for speeds above 300 mph.

The use of Mambas provides numerous other advantages in addition to lightness of weight and smallness of size. These include ample "bleed" air and power for cabin pressurization, which is a "must" for any passenger-carrying airplane capable of high performance. Flying "over the weather" or most of it becomes a reality with pressurization, and cabin comfort is assured in the smooth air of higher altitudes. The greatest dividend from high-level cruising is the ability to cover more distance per horsepower-hour and thereby achieve higher utilization and operating economy.

"Above 30,000 ft., this airplane would cruise at less than 45 per cent of sea level rated power," said Erickson. "Less drag pays off handsomely when you fly at higher levels."

To get up there for greater aerodynamic efficiency, the airplane's design provides for an unusually high rate of climb on the order of considerably over 2,500 ft. per min. at sea level. Short field characteristics are emphasized, a 2,500-ft. strip being sufficient.

Erickson and his engineers consider 1,400 miles as an ideal length of cruising range for their transport. This makes possible a coast-to-coast trip with only one refueling stop. A range of only 1,000 miles would require two refueling stops with all the attendant delays. Their design would thus offer the executive passenger an opportunity to travel 1,400 miles in less than 4 hours, transact business at his destination for two hours or more, and return 1,400 miles to his home all in the same 10-hour working day.

While technical details and specifications are not being released by Temco, the description furnished by Erickson adds up to the following in round figures:

Airplane: Temco Model 32, a design study, with pressurized cabin.

Power Plants: Two Mamba turbo-prop engines rated at more than 1,700 equivalent shaft horsepower each.

Gross Weight: Approximately 16,000 lbs.

Useful Load: Approximately 6,500 lbs.

Cruising Speed: More than 300 mph.

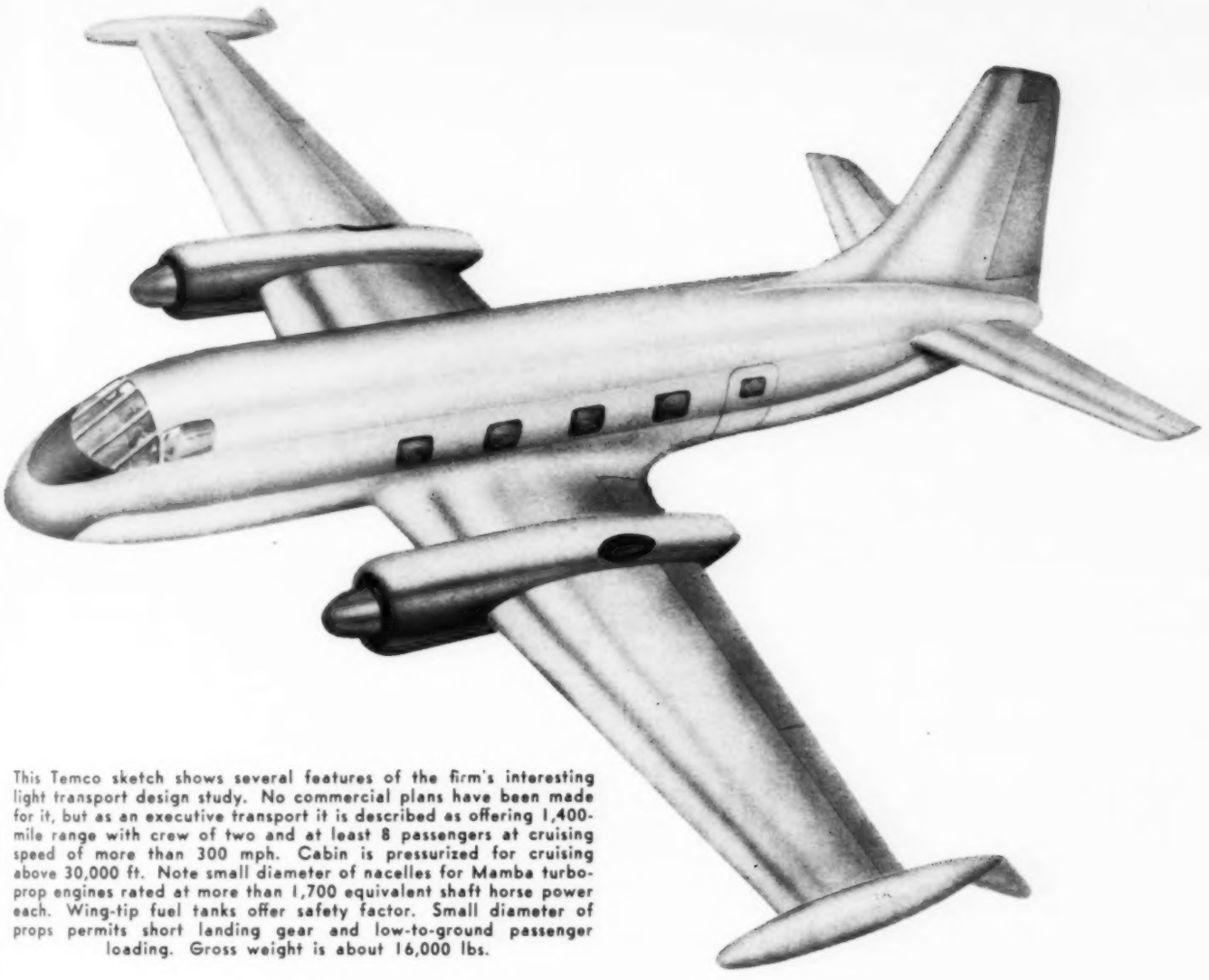
Ceiling: Above 30,000 ft.

Range: Approximately 1,400 miles.

Rate of Climb: More than 2,500 fpm.

Weight allowance for fuel is about 4,000 lbs., or about 600-odd gals. While the seating arrangement has not been finalized in the design study, the above estimates would indicate very roomy accommodations for crew of two with at least 8 passengers—plus generous allowances for baggage and full air carrier-type instrumentation and radio equipment for communications and navigation, this being required for complete utilization in the performance range contemplated.

Key to the design study is the Mamba turbo-prop engine. This engine has passed Britain's 150-hour military requirements and has been used in numerous postwar British designs. The most outstanding of these is the Fairey Gannet, now on duty as an anti-



This Temco sketch shows several features of the firm's interesting light transport design study. No commercial plans have been made for it, but as an executive transport it is described as offering 1,400-mile range with crew of two and at least 8 passengers at cruising speed of more than 300 mph. Cabin is pressurized for cruising above 30,000 ft. Note small diameter of nacelles for Mamba turbo-prop engines rated at more than 1,700 equivalent shaft horse power each. Wing-tip fuel tanks offer safety factor. Small diameter of props permits short landing gear and low-to-ground passenger loading. Gross weight is about 16,000 lbs.

submarine warfare attacker with the British fleet and given super priority for large-scale production. The Gannet uses the Double Mamba, which is two Mambas in the nose of the airplane driving two counter-rotating propellers in the nose. This installation was designed so that both engines are used for take-off and when otherwise needed while only one is used for cruising.

Earlier use of the Mamba included considerable flying in a British Dakota version of the C-47, with two single Mambas mounted conventionally. It has also been mounted in the 4-engine Armstrong Whitworth Apollo transport, a Handley Page transport, the anti-submarine warfare Blackburn YB1, and Boulton Paul Balliol trainer, the Avro Athena trainer and the French Breguet 96 Vultur, a shipboard strike aircraft.

Erickson believes turbo-prop engines offer sufficient advantages over pure jet engines to make them more widely used than straight jets in commercial aircraft. He contends that propeller problems have been solved one by one in England until the turbine-propeller combination has far more practical applications than is generally known in this country, where most effort has been devoted to straight jets.

The propeller on the Mamba is of small diameter and is described as a hydraulically-controlled, constant-speed, full-feathering propeller of simple design. At a turbine speed of 14,500 rpm. for cruising, the propeller turns 1,450 rpm. at a ratio of about 1 to 10. Ground idling speed of the propeller is about 800 rpm., at which the engine is not capable of producing much power. Consequently, blade pitch is extended down to much finer settings than with propellers on piston engines, the basic pitch stop of the blades on the Mamba being about 5 degrees. However, provisions are made for automatic locking of blade angle in event of governor failure and for automatic feathering in event of power failure. "Discing" at high rpm. provides excellent control in approaches for landings, this control being more positive than with piston engines.

An electric motor winds up the engine rotor to about 4,000 rpm. for starting, with the engine pulling away at that rpm. on its own power. Starting cycle is 30 seconds. The Mamba has a 10-stage axial compressor and a 2-stage turbine, with 6 combustion chambers. On the Apollo transport, maximum width of the cowling is only 31 inches. Bare engine weight is only 750 lbs.

Erickson reports specific fuel consumption for the Mamba is .59 lb. per hp. hr. as compared with .45 lb./hp. hr. for reciprocating engines of similar power ratings.

"This engine has been developed to a very fine degree of efficiency for economical operation and I consider it an ideal power plant from every standpoint," Erickson said. "The only thing wrong with it is that it is not as well-known and appreciated in America as it is in England." ★ ★ ★

This fleet of two new four-place Cessna 180's and a 5-place Cessna 190 has been credited with reducing highway accidents and violations in Missouri. When not patrolling busy roads in traffic work, they are engaged in capturing fugitives, transporting prisoners and officials, rescue work, disaster relief and meeting other day-to-day needs of the Missouri State Highway Patrol.
—(FLIGHT MAGAZINE Photo by the Author.)

Wings For Highway Safety

Missouri troopers are reducing highway accidents by catching violators from the air

By TOM ASHLEY

LIGHTPLANES have contributed greatly to the improvement of public service activities wherever their use has been tried. An outstanding example is furnished by the Missouri State Highway Patrol. Its troopers use a fleet of airplanes in an efficient, well-organized, never-ending campaign against highway accidents and traffic violations — a winged safety drive which was launched in 1946 with war surplus lightplanes and became so successful that high-performance airplanes of the latest type are now used.

"The record shows that our use of airplanes in highway traffic work has definitely reduced the number of traffic accidents and violations," says Colonel Hugh H. Waggoner, superintendent of the Missouri State Highway Patrol.

With 40 million automotive vehicles on the nation's highways killing thousands of persons annually, safety experts and highway officials everywhere have been challenged to find the solution to traffic problems. Highways constructed when only half as many autos were in use have become overloaded. Curves and grades engineered to slower speeds have become more hazardous for modern autos having far more powerful engines. With it all have come problems making traffic control and law enforcement more difficult.

In the face of this, any reduction in highway accidents and violations becomes quite an achievement. So we went to Jefferson City, the Missouri capital, to see how Colonel Waggoner's flying troopers do it. We went there over the July 4 weekend, one of the year's bloodiest highway holidays. With its excellent roads and many resort areas, Missouri packed its highways over the Fourth — but there was no bloodshed along the heavily-used routes radiating out of St. Louis, Kansas City and the Ozark resort country. Not only were accidents fewer than formerly but traffic violations were not as numerous.

Three Cessnas Used

In the St. Louis metropolitan area, a Missouri State Highway Patrol Cessna 180 winged up and down the busy roadways. A second Cessna 180 of the Patrol worked the highways in Central Missouri while the Patrol's Cessna 190 kept order in the busy Kansas City area. Each of these three police airplanes directed a well-organized ground force of patrol cars and the three separate areas were tied together at state headquarters in Jefferson City where Colonel Waggoner directed the action with a running account of all patrols coming in over radio, teletypewriter and telephone facilities of the department.

How It's Done

To see how aircraft patrol of auto traffic works, let's go along with W. S. Barton, who flies the patrol's St. Louis traffic jams. Barton, newly promoted to the rank lieutenant, begins his day at about 5 a. m. when he heads for the airport. He's proud of the new

Two of Missouri's flying state troopers are Sergeant Hugh Wallace (left) and Lieutenant W. S. Barton, shown by one of their Cessnas. Both were civilian pilots before the Missouri State Highway Patrol sprouted wings and both helped establish the flying patrol.
—(FLIGHT MAGAZINE Photo by the Author.)

Cessna 180 the Department acquired a few weeks ago. It's got performance, he says, and that's what the Patrol has needed ever since he helped start its flying activities in 1946 with surplus L-5's. "The 180 is the best flying airplane I've been in and it makes those surplus clunkers look like the junk they are," says Barton, who learned to fly as a civilian in Kansas City at Bill Ong's in 1941.

Off the ground early because the holiday weekend traffic is on the road early, Barton reports in with radio. Patrol cars liven up the radio, too, and soon the pattern is set and working, before the long lines of cars choke the curves and grades on the highway below.

"I do most of my work about 500 ft. above the highway," Barton explains. He slows the Cessna to about 80 mph. and takes up his spotter's position just off to the side of the line of autos moving out of the city. Barton rolls out the Cessna's big flaps as he slows down and holds his altitude. "The flaps give me more control and stability. I also get a lot of help from the Hartzell propeller's constant-speed governor. With flaps and governor, I can do whatever I want to do and the Cessna hangs right in there solid."

Soon Barton flies alongside and above a car with a large, brightly-painted number on its top. It's one of a dozen patrol cars working with him in the morning traffic. Barton gives him a call to let him know he's up there and in the conversation the car and the airplane size up the traffic situation. It looks good, they agree. People seem to be sensible this morning. The newspapers have given good play to the State Highway Patrol's plan for keeping tab today in the interest of safety. Besides, a driver now and then glances up and sees the airplane hanging above on the alert, "Police" boldly lettered under one wing. The radio conversation broadens as troopers up and down the concrete ribbon report into the Cessna's cabin. Barton slows down to 60 as a grade in the highway comes up and the traffic slows. Police FM radio links the airplane with cruising troopers far and wide, a couple hundred miles in some instances, and the Department's three airplanes can be summoned to any part of Missouri in less than an hour. While flying at 60 above a traffic jam, Barton can roll in his flaps, add power and top 160 mph. cruising speed in a few seconds to reach some patrol car across the horizon.

But as he accelerates the Cessna now, no call has summoned. At the top of the grade, Barton spots a violator a few miles ahead. He overtakes the auto in no time, slows down again and watches, literally looking down the violator's throat as the unsuspecting motorist pulls out of the line and begins weaving across the brightly-painted yellow stripe in his lane. This stripe marks no-passing zones where it is hazardous because of hills or curves to pull out of the line of traffic. Frequent road markers proclaim this but this motorist ignores them as well as the blind spots ahead and continues darting in and out.

Closing in on Violators

On the radio, Barton calls to the next numbered patrol car ahead — the troopers are spotted every 10 miles on this highway — and gives them the story. "I have a maroon 1953 Ford about to get into serious trouble," he radios the trooper ahead. "Better pull him off the road and have a talk with him. The driver is wearing a dark blue sport shirt with short sleeves. His car has an Illinois plate." Barton gives the patrol car a running account of his violator, describing license number and occupants in detail through the use of binoculars. In a few minutes he sees the patrol car ahead has pulled out on a side road to await the maroon 1953 Ford. "Here he is," radios Barton. The troopers on the ground walk out onto the highway and flag their violator down.

Back in Jefferson City, Colonel Waggoner tells us violators caught from the air have yet to get away with their lawbreaking. In every case where the evidence has been chal-

(Continued on page 37)

Colonel Hugh H. Waggoner, superintendent of the Missouri State Highway Patrol, is one of America's outstanding authorities on highway safety. A trooper since 1937, he was youngest state police superintendent in the country when appointed to the post in 1945 at age of 33. Col. Waggoner established his air patrol in 1946 with war surplus airplanes. It proved effective from the start.
—(FLIGHT MAGAZINE Photo by the Author.)

Success With a Flight School

—(FLIGHT MAGAZINE Photos by the Author.)

How Zeke Smith ran his last 37 bucks up to $35,000 in three years of flying school operations

By E. H. PICKERING

ZELMAN G. (Zeke) Smith of San Antonio, Texas, has just completed three years of operating a flying school—and is more optimistic than ever over his business at a time when many flying schools have found the going too tough to last. On June 4, 1950, Zeke started operations with his last $37, a borrowed J3 Cub and the use of about-to-be-abandoned Davis Airport located in the shadow of San Antonio International Airport.

During daylight hours, it is difficult to tell which airport is the busier. For every airliner and executive airplane landing and taking off from the big terminal, Smith Flying School's 21 little training planes and 80 students are just as busily flying from the 2,500-ft. strips at neighboring Davis Airport. Eighteen of the planes are owned outright by Zeke and his wife; three are leased. Their students jam the parking area every afternoon.

How come? How can such a situation be possible when so many operators are bemoaning the lack of students, the lack of interest in flying, the inability to keep students flying once they've started or when they

Half of Zeke's students are cash civilian customers — and there's always a friendly group in a hangar session at the little airport.
—(FLIGHT MAGAZINE Photo by the Author.)

have finished a course and acquired a license?

With a shy smile, modest Zeke Smith gives his answer: "We treat the customer like a friend and we don't look on him as a victim to be taken for every last penny he's good for." To Zeke, people are individuals as well as friends. A strange car can not drive up on his parking lot without Zeke noticing it and walking out to introduce himself. To Zeke, every strange car has someone in it who is curious about airplanes. Else it wouldn't drive up to his airport. So Zeke walks out, quietly greets the visitors, tells them they're welcome and invites them to get out and look around.

Children? Sure, let them look, too. They can even climb into the airplanes and sit down if they like. To horrified remarks about kids damaging his airplanes, Zeke comments: "We've got our own shop and a little dope and patch doesn't cost much. There's no penitentiary fence around us to keep people out—we want 'em in here mixing with the airplanes."

Zeke sees to it that the "airport widows" get a chance to find out what their husbands see in flying. He personally takes them up for a quiet, smooth flight, explaining what makes an airplane tick. There's no charge for this—it's all part of keeping husbands flying. Zeke has produced several converts who are now co-piloting for their husbands on week-end cross-country trips. After a ride with Zeke, there's a good chance the ladies have a better understanding of their husbands' desire to learn to fly and that means a longer-lasting student.

Smith's students have a habit of sticking to their instruction until they receive their tickets. Only twice in three years has he been asked to refund money on an unfinished flight course. In both cases the students were military personnel who were being transferred to new posts. To his knowledge, Smith has never had a student quit flying.

Smith Flying School's students are typical people. Some are struggling to

(Continued on page 36)

Far-traveling executive pilots recommend Zeke Smith's school to friends. Student shown here with him is Enrique Flores of Uruguay, who met one such executive pilot in his far-off country and followed the traveler's suggestion that he take his instrument training from Zeke in San Antonio.
—(FLIGHT MAGAZINE Photo by the Author.)

--FLIGHT MAGAZINE Photos by E. H. Pickering.

Flight shots emphasize 35-gal. wing-tip tanks used by WE-1 conversion. In photo above, note exhaust augmentor tube beneath nacelle.

The WE-1 Navion Conversion

By GEORGE E. HADDAWAY

FOR the past two months, commercial and private pilots, air traffic controllers and the general run-of-the-field airport folks around San Antonio International Airport have been all agog over a "home-town" product that's been a-building in the Associated Manufacturing and Engineering Company hangar for over a year. It is the WE-1 Navion Conversion, with two 225-hp. Continental engines.

"We've kept it pretty well under wraps during engineering and fabrication because we wanted to be sure of what we had before putting out anything," says Darrell White, one of three brothers who own the company. "Now that our CAA static tests are behind us, plus quite a few hours of flight testing, we feel free to reveal what we have—a 190-mph. true-airspeed airplane with 180-mph. cruising speed using 75 per cent power at 8,500 ft. With 110-gal. gas capacity and a 3,895-lb. gross weight, we're now convinced that we have a highly utilitarian airplane for the executive. We expect final CAA certification soon, only the official flight tests remaining to be finished."

When Darrell and his brothers, Jep and George, decided to explore the possibilities of converting a used Navion into a twin, they scouted for competent engineering counsel. They found it in the person of Ed Brush, top man of Texas A & M College's aeronautical engineering department. That was in April, 1952, and Brush and his assistants have been hard at the Navion job ever since, working during spare time on a consulting basis. Nothing has been left to guess or trial and error—it has been a complete job of engineering.

The 225 Continental was selected because its rating is for continuous output of 225 hp., because it is comparatively light in weight at less than 2 lbs. per horsepower and because it offered a simple installation. With it they coupled Fletcher exhaust augmentor tubes for improved cooling, especially on the ground and in climbing.

Hartzell full-feathering, constant-speed propellers were installed for acceptable single-engine performance.

Wheel base of the landing gear was extended to improve ground handling and balance by moving the nose wheel some 23 inches forward, leaving the main wheels in their original position. Even so, there is no more weight or stress on the nose wheel than in the single-engine design. Twin-engine arrangement and increased weight dictated the use of toe brakes instead of the original control lever and Goodyear brakes were installed on larger capacity wheels with 6-ply tires. The weight increase also forced an ingenious reinforcement of the main landing gear struts.

The primary wing structure was considerably reinforced, and much engineering went into the engine nacelles and wing-tip tanks. But the beefing up of the structure is described as being neither costly from a weight standpoint nor difficult for fabrication.

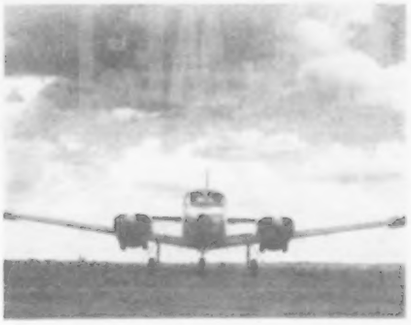
Fuel capacity was increased from the single-engine Navion's standard 39.5 gals. to 109.5 gals., through the use of wing-tip tanks holding 35 gals. each. These locate the fuel as far as possible from the cabin as a safety factor, and the designers anticipated the end plate effect of the tip tanks would result in additional improvements in climb performance.

Vertical tail surface was increased by rebuilding the original Navion surface and adding a controllable rudder tab for directional trim in single-engine operation.

Interest in maximum safety and reliability led to the complete duplication of generators, electric fuel pumps and hydraulic pumps.

Although no changes were incorporated in the original cabin design, a completely new control pedestal and instrument panel were created. Quadrant-type engine controls, flap, tab and landing gear controls are mounted on the control pedestal on the floor.

Long nose, extension of nosewheel 23 ins. forward of former position, and redesigned vertical fin highlight this silhouette.



easily accessible to both front seats but not blocking entry to either seat. All electric switches and instruments are mounted in an overhead panel just above the windshield. A dual-reading tachometer and double engine guages provide simplicity. Complete flight instrumentation is standard equipment.

Additional baggage allowance was provided, the existing space behind the rear seat being augmented by a compartment in the fuselage nose. Access to the nose compartment is through the original engine cowling doors, which were retained.

Darrell White, who is doing all the flight testing, said the converted airplane's flying qualities exceeded his company's expectations in that little or no difference in handling characteristics are apparent as compared to the single-engine Navion. Response to controls is excellent and trim characteristics are somewhat better. Both lateral and longitudinal stability are completely satisfactory under different loading conditions. Estimated performance figures quoted by him are as follows:

	Max. Wt. 3,895 lbs.	Min. Wt. 2,908 lbs.
Twin Engine—		
Max. Spd., SL, mph.	196	198
Max. R/C, SL, fpm.	1,640	2,460
Svc. Clng., ft.	20,800	26,550
Abs. Clng., ft.	22,300	27,800
Single Engine—		
Max. Spd., SL, mph.	136	144
Max. R/C, SL, fpm.	360	800
Svc. Clng., ft.	6,200	13,800

(Continued on page 49)

Engines are 225-hp. Continentals, with constant-speed, full-feathering Hartzell propellers for single-engine reliability.

Helicopter Service Outlook

A round-up of airline and industry comment analyzes problems and opportunities

PART II

(EDITOR'S NOTE: This is the concluding article devoted to interesting and significant information on plans for commercial helicopter passenger operations. The first appeared last month. It covered discussions by helicopter manufacturers, airlines and representatives of 19 nations at the IATA Helicopter Symposium. Points covered last month included the role of the helicopter in airline operations; availability of helicopter transports, and operational problems now and anticipated. The following picks up the Symposium's discussion of helicopter design characteristics.)

GOVERNMENT representatives warned that unless noise levels can be held down, many heliport locations might be denied to operators. Noise considerations are among the factors which will have a substantial effect on helicopter operations, since excessive noise might restrict city-center services and the measures necessary to reduce noise might impose weight penalties.

Control of cabin noise was considered easy by normal soundproofing. European operators reported they had few complaints about external noise with helicopters now in use and recommended 90 decibels at a distance of 200 ft. as a desirable maximum criterion. Government spokesmen pointed out that complaints about noise seem to begin when the noise level reaches a point 15 decibels above maximum criterion of 75 decibels at 150 ft. for daytime and 55 decibels at 150 ft. at night.

Manufacturers are aware of the noise problem and are searching for means of reducing it. It may not be necessary to reduce noise but to change its frequency. A metropolitan operator suggested that a compromise might involve devoting less weight to internal soundproofing so that more weight could go into external mufflers.

There was discussion on the question of whether a single rotor would be preferable to a multi-rotor system. The consensus was that there is no categorical answer to this, that there will be a role for both types and that this will vary with the circumstances of equipment and operation.

As to wheel or skid landing gear, manufacturers suggested there would be some economy in weight and in stress on rooftop landing surfaces if operators used floats or skids instead of wheels. But the carriers felt that wheels are necessary for easy ground handling.

Helicopter passenger cabin specifications and comfort standards came in for full discussion. Cabins are needed which can be easily converted for either passengers or cargo or for combination of the two. In inter-city machines, passenger accommodations would approximate those of tourist-type aircraft with 36-in. seat pitch and 17-in. seat width, while bench-type seating as on street cars could be used for metropolitan services. In both cases, it was felt that cushions and arm rests can be dispensed with to conserve weight, and that seats should be of lightweight alloy or reinforced plastics. Seat belts will be necessary.

Doors at front and rear are necessary for quick turn-around, with suggestions calling for additional doors in the side of the cabin and hatches at the bottom. Built-in steps were accepted generally. While pressurization is not needed, cabins will need the same heating and ventilating arrangements as airplanes. Largest possible windows are desired for better psychological effect on passengers and to facilitate sightseeing. Toilets are necessary for inter-city service but not for metropolitan routes. It was stated that airsickness is less likely in helicopters than in airplanes.

Although operators want a single pilot for the crew on short flights whenever consistent with safety, it was acknowledged that co-pilots will be necessary at times in smaller transports and very often in larger ones. So dual instruments should be provided, each group fully readable by a single pilot. Basic flight instruments would be a group consisting of a vertical speed indicator, artificial horizon, rotor and engine speed indicator, altimeter, directional aid and an air speed indicator. Suggested other instruments included backward and

Helicopter Council

HELICOPTER design, manufacturing and sales and service progress in the United States revolves around 9 manufacturers comprising the Aircraft Industries Association's Helicopter Council. Chairman is B. L. Whelan, general manager of Sikorsky Aircraft, and Stanley Hiller, Jr., president of Hiller Helicopters, is vice chairman.

Member companies and their addresses and chief executives are Bell Aircraft Corp., P. O. Box 482, Fort Worth, Tex., Harvey Gaylord, vice president; Cessna Aircraft Co., Wichita, Kansas, J. E. Leonard, helicopter division manager; Doman Helicopters, Inc., P. O. Box 603, Municipal Airport, Danbury, Conn., Glidden S. Doman, president; Hiller Helicopters, 1350 Willow Road, Palo Alto, California, Stanley Hiller, Jr., president; Hughes Aircraft Co., Aeronautical Division, Culver City, California, R. E. Hopper, director; Kaman Aircraft Corp., Bradley Field, Windsor Locks, Conn., Charles H. Kaman, president; McDonnell Aircraft Corp., Lambert-St. Louis Airport, P. O. Box 516, St. Louis 3, Missouri, J. S. McDonnell, president; Piasecki Helicopter Corp., Morton, Pa., Frank N. Piasecki, chairman; and Sikorsky Aircraft Division, United Aircraft Corp., Bridgeport 1, Conn., B. L. Whelan, general manager.

Don Ryan Mockler is director of the council, with Jean Ross Howard as assistant. His address is Helicopter Council, Aircraft Industries Association, 610 Shoreham Building, Washington 5, D. C.

lateral speed indicators, and additional rpm. indicators for rotors and engines in multi-engine helicopters.

In designing for maintenance, operators stressed the great importance of utmost simplicity and ease of maintenance, including easy interchange of engines and other components and greatest possible accessibility. Streamlining is not as necessary as in airplanes and the exterior should be designed for the convenience of servicing. An engine change in two hours or less should be possible so that the machine would be out of service only for that length of time.

HELIPORT REQUIREMENTS: Preference for a name for landing sites narrowed down to "heliport" and "rotorstation," the former being desirable because it is the same in English and French. Local circumstances will dictate whether a city should be served by a central heliport capable of handling a number of small heliports around the area. Separation of heliports will require further operating experience. If straight-in approaches from different directions are involved, close-together locations may be possible. Single-engine helicopters presently avoid built-up areas and do not fly over them to any extent requiring emergency landing sites in such areas. Multi-engine 'copters possessing one-engine-out performance will not need emergency sites in built-up areas as these will be able to sustain flight to the regular landing place.

Heliport dimensions were varied up to a limit of 300 by 300 ft., cited by European inter-city operators as their preference. Part of this space is for helicopter parking. Civil studies in the U. S. have resulted in a criteria for minimum space of 50 per cent more than the rotor diameter while in military operations the standard for open field spaces is twice the rotor diameter, or a circle 250 ft. in diameter. Metropolitan operators plan to use landing areas about 200 ft. square. Plans are being made in New York for a heliport incorporating two such areas, one for take-off and the other for landing, together with an intervening area for administration and passenger handling within a single city block. The dimensions discussed, together with characteristics of the approaches to these heliports, constitute limitations in which manufacturers will have to build their machines and will determine economic characteristics to a large extent. Manufacturers had no special comment since they felt they can design to fit any requirement. If operators wish to have hovering power with one engine out, they will need no more landing space than that required for their wheels while with any decrease in this critical power, the area requirement would grow.

Only limited space for parking will be needed by metropolitan operators, but more might be necessary for inter-city operators to hold helicopters for flight departures. Rotor folding was advanced as a possible space saver. Metropolitan operators felt they may be able to handle three helicopters at a time at their heliports — one landing, one loading and one taking off — and saw nothing to prevent take-offs at one-minute intervals, with a slower interval during instrument conditions. Limitations on obstructions in respect of angle of clearance, turbulence and visibility are expected to be less stringent than with fixed-wing aircraft. European experience indicates one foot of clearance for every two feet away from the edge of the heliport, but U. S. opinion favors more severe limitation of one in ten. Turbulence, especially in city centers, would affect the helicopter in much the same way as normal aircraft. European experience was said to have made it necessary to discontinue operations out of ground-level heliports in cities when winds reached 35 mph. or more, this being cited as arguing for rooftop heliports.

It was conceded there may be necessity for occasional refueling and minor

(Continued on page 32)

8-Place Doman Air Taxi Makes First Passenger Hop

THE helicopter coming in for a landing above is the newest single-engine transport type flying — the 8-place Doman "Air Taxi." Picture shows Test Pilot Turpin Gerard completing its first flight with seven passengers aboard.

Developed and manufactured by Doman Helicopters, Inc., Danbury, Connecticut, it is undergoing CAA type certification. One feature of the company's military contract is permission to produce commercial LZ-5 versions of the YH-31 field ambulance helicopters on the same production line.

The LZ-5 commercial version is powered by a 400-hp. Lycoming SO-580-D engine and has a 2,140-lb. useful load at a gross weight of 5,000 lbs. Disc loading for the 48-ft. rotor is 2.76 lbs./sq. ft. Cruising range is 220 miles and top speed is 110 mph. Basic feature of the Doman helicopter is its use of hingeless rotor blades, four of which are used on the main rotor. Disc area is 1,810 sq. ft., and the rotor stands 10 ft. 3 ins. above the ground. Its 3-bladed 9-ft. tail rotor clears 6 ft. 2 ins. to the ground line.

Before assembly, the Doman rotor unit is pre-tested and the blades pre-tracked through the company's own system, both operations permitting the ship to fly immediately on rolling off the production line. Ten major steps comprise final component assembly of the complete helicopter. These include the main rotor transmission, the rotor hub, the rotor collective pitch control, cyclic pitch control, trim system, engine, fuselage structure, fuel cells, landing gear and tail rotor system.

The cabin uses 7-ft. folding doors for easy loading. The 8-cylinder, "flat" Lycoming is mounted in the nose and below the floor.

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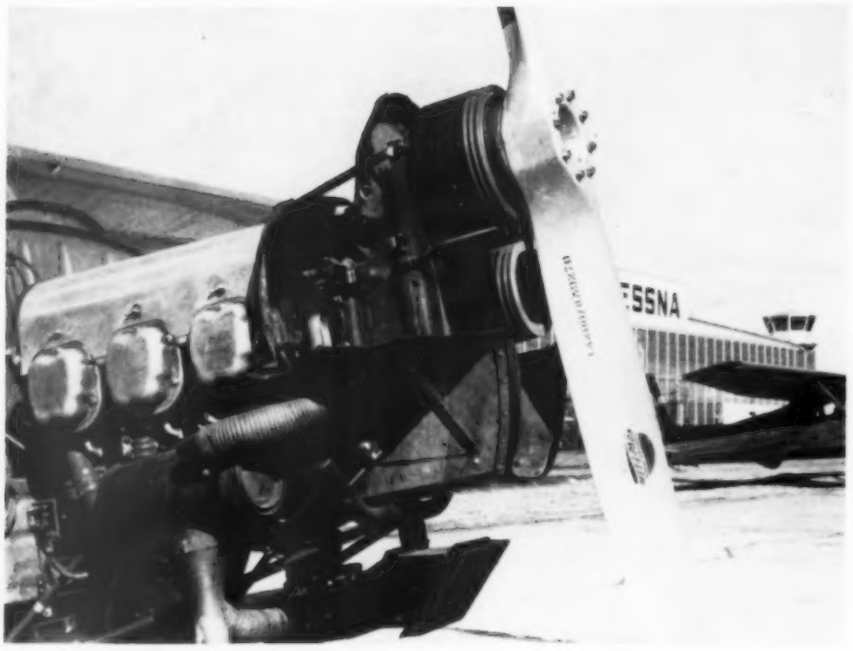


CAA CERTIFICATION FOR V-BELT PROPELLER DRIVE has been issued to Continental Motors following joint experimentation by Cessna Aircraft Co., and Goodyear Tire & Rubber Co., assisted by Continental Motors and McCauley Propeller Co., in which a 145-hp. Cessna 170 was used. Over 1,000 hrs. of service testing was conducted. In flight tests, a 92-in. McCauley prop with 70-degree pitch gave the 170 a 12 per cent increase in rate of climb but even better results are expected from a propeller-engine combination designed for the purpose. Lower weight and costs would be the advantage over a geared engine-prop combination. Belts shown are 3/8ths of an inch wide, 7/16ths of an inch deep, and 41 ins. long. Pulleys are 9 and 6 inches in diameter. Installation pictured has over 800 hrs. of use and is still in good condition.
—(Cessna Photo.)

AIR REPORT

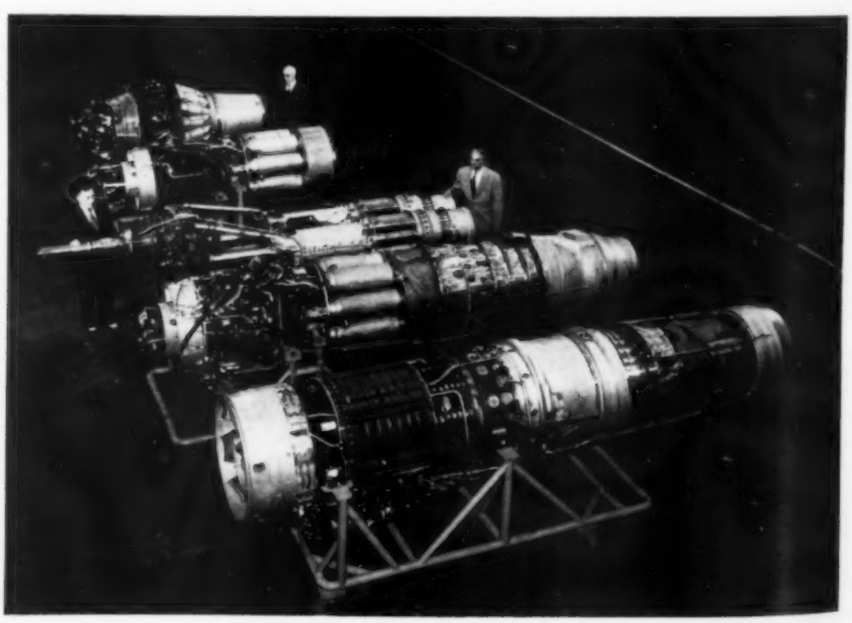
(Continued from page 10)

cent of the total airframe — his previous contract to produce the entire airframe was cancelled under the new administration's economy drive in aircraft procurement. He said he had every reason to believe at least one of Temco's proposed aircraft designs would be accepted by the services in the near future. . . . **GUS ERICKSON, CHIEF ENGINEER FOR TEMCO, IS GOING TO TOUR EUROPEAN AIRCRAFT CENTERS** for a personal glimpse at new developments in airplanes and engines.

NEWEST HELICOPTER COMPANY is Bensen Aircraft Corporation at Raleigh-Durham Airport, Raleigh, North Carolina. A release from the new firm says it is capitalized at one million dollars, has leased 27 acres of the Raleigh-Durham airport including a hangar with 10,000 sq. ft. of area for shops and engineering space, and will devote its activities primarily to development, research, consulting and subcontracting services for the helicopter industry. President is Igor B. Bensen, until recently chief of research for Kaman Aircraft and still a consulting engineer for Kaman. Seth B. Thompson, vice president, has held various engineering positions at United, Burnelli, Brewster and Kaman Aircraft. Mary A. Bensen is secretary-treasurer. The new company will specialize in helicopter power plants, performance analyses, experimental and theoretical investigations, and production manufacture of medium-size aircraft sub-assemblies.

PIONEER AIR LINES averaged 14.48 passengers per airplane mile flown with Martin 202's for the year ending June 30, 1953, a 31 per cent increase over the average of 11.09 passengers for the previous 12 months. Total passengers flown for the 12 months ended June 30, 1953, were 175,972, only 2 per cent more than the 172,744 passengers flown during the preceding year, but there was a 16 per cent reduction in airplane miles flown, this dropping from 4,036,771 miles in the 1952 period to 3,384,164 in the 1953 period. Revenue passenger miles were up 11 per cent.

NATIONAL BUSINESS AIRCRAFT ASSOCIATION, INC., is the new name for the Corporate Aircraft Owners Association. Chairman Cole H. Morrow, chief plant engineer of J. I. Case Co., Racine, Wisc., said the old name was awkward and did not fairly describe the segment of aviation represented by the group's membership. He also announced that Pan American World Airways became the



ALLISON'S FAMILY OF AIRCRAFT GAS TURBINE ENGINES includes five types now in production at Indianapolis. Together these types have flown over 3 million hours. Beginning with the foreground, they are the J71, said to be more powerful than any jet in production; J35 with afterburner for Northrop F89; T40 turbo-prop for Douglas A2D Skyshark and Convair R3Y Tradewind; J35-A-29 for Republic F-84G, and J33 for Lockheed T-33 trainer and Grumman F9F-7 Panther. Men are, left to right: Assistant General Manager Harold H. Dice, Manufacturing Manager J. C. Cunningham, and Engineering Director R. M. Hazen, all of Allison Division of General Motors.
—(Allison Photo.)

Designing

FOR THE FUTURE . .

DESIGNING FOR LOW COST

TEMCO's expanding engineering staff approaches the complex problems of military aircraft design with thorough *cost-consciousness* . . . cost-consciousness toward original production, as well as operation and maintenance. TEMCO design is guided by the company philosophy to "build a quality product . . . on schedule . . . at the lowest possible cost." A good example of this creative foresight is a current TEMCO trainer design. It has wingtip extensions that make it possible for the trainer to be used in *two* stages of training instead of one.

Already recognized for its record low-cost *production*, TEMCO Aircraft Corporation is building for the future with cost-conscious *design*.

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AIRCRAFT CORPORATION

DALLAS, TEXAS

Plants at: DALLAS GARLAND, TEXAS GREENVILLE, TEXAS

Leadership Demands Constant Achievement

Lockheed's huge Marietta, Georgia, factory speeds output of U.S. aircraft

EXPANDS DEFENSE PRODUCTION IN INDUSTRIAL SOUTH

Lockheed and the growing Industrial South today provide the U.S. with one of the world's largest aircraft factories—Lockheed's huge Marietta, Georgia, plant.

A short distance from Atlanta, this factory complements Lockheed's California Division, providing the industrial dispersal now considered vital to U.S. defense.

Lockheed's Georgia Division employs over 13,000 people and has an $800 million backlog of plane orders. That's big business—and an excellent example of new production in the fast-growing Industrial South.

This Lockheed plant is currently producing big Boeing B-47 bombers for the U.S. Air Force in a cooperative defense effort. Soon the plant will also produce America's first airplane originally designed for turbo-prop power, the Lockheed C-130A cargo transport for the Air Force.

Look to

Lockheed

for Leadership

LOCKHEED AIRCRAFT CORPORATION • MARIETTA, GEORGIA, AND BURBANK, CALIFORNIA

Lockheed

C-130A Transport— One Plane for 3 Jobs

Soon in production at Lockheed's Marietta, Georgia, plant, the U.S. Air Force's new turbo-prop transport, the Lockheed C-130A, will fly higher and faster than any other military transport and perform a great variety of missions.

The C-130A is the first transport specifically designed for turbo-prop engines, which harness jet power to propellers.

Air Force Competition Winner

Winner of an industry-wide Air Force design competition, the C-130A transport will perform three different jobs:

1. Carry soldiers, paratroops, patients and all types of ground force equipment up to items weighing twelve to twenty tons.
2. Fly high-altitude, high-speed missions as a tactical airplane for the Air Force.
3. Transport passengers on long-range flights for the Air Transport Command.

Unique Construction

The C-130A has a floor as strong as a concrete warehouse floor a foot thick. Its fuselage is only 45 inches off the ground—level with truck-bed height for easier loading and unloading. The pressurized cabin permits ground-level comfort for military personnel at high altitudes.

Of special importance to the Air Force, the new transport will require only short take-off and landing runs. Special tandem-wheel tricycle landing gear permits it to use emergency landing fields in forward areas, or even unfinished air strips.

Prototypes of the airplane are nearing completion at Lockheed's Burbank, Calif., plant. The plane will go into quantity production at Lockheed's Georgia Division, in Marietta, where giant B-47 jet bombers are currently being built.

first major airline to join the association.

APPROXIMATELY 120 PRIVATE PLANES were expected to participate late in July in a Canadian air tour organized by the chamber of commerce at Portland, Oregon, and sponsored throughout Canada by the Royal Canadian Flying Clubs Association.

BOOM IN AMERICAN AIRLINES BUSINESS is reflected by figures showing its revenues for the first 6 months of 1953 were $12,000,000 higher than for the same period in 1952. During June, AA averaged more than 10 million passenger miles daily and on July 1 it flew 12,100,000 passenger miles in one day. The load factor was 74.2 per cent of available seat miles in June compared with 80.4 for the previous June, reflecting an increase in schedules resulting from addition of 8 DC-6B's to the fleet. AA is now employing more than 1,000 stewardesses. It is operating 330 daily flights with a fleet of 170 airplanes. Last month the airline graduated 178 new co-pilots who began flying the line.

A NEW ADDITION TO SOUTHWEST AIRMOTIVE'S ENGINE SHOP BUILDING will double the facility's production area on Love Field, adding 35,000 sq. ft. for engine shop use in a brick-and-steel addition and bringing total Southwest Airmotive floor space to 225,000 sq. ft. Winston Castleberry, vice president, said Southwest's new engine shop overhaul goal is 350 rebuilt engines per month —mostly 450-hp. Pratt & Whitney Wasp Juniors.

NEWEST WORLD'S SPEED RECORD is 715.697 mph. over a 3-kilometer course at Salton Sea, California, set last month in a North American F-86D Sabre by Lt. Col. William F. Barns while carrying the airplane's normal operational load. He made four runs, fastest of which was 721.351 mph. The F-86D has a nose radar for search and is equipped with a retractable rack from which it can fire 24 Mighty Mouse rockets.

MAJOR DAMAGE WAS INCURRED BY THE AG-1 EXPERIMENTAL AGRICULTURAL RESEARCH AIRPLANE constructed at Texas A. & M. College when it crashed last month during a demonstration near Lubbock, Texas, for Agriculture Secretary Ezra Benson and several hundred agricultural people. Following loss of power on take-off a wing clipped a highline. CAA Pilot John Paul Jones was not injured. Observers said the type of accident emphatically proved the effectiveness of safety features designed into the prototype. The crack-up probably means the end of the AG-1 experiment as the craft was damaged beyond economical repair.

AIRLINE BRIEFS: It's being rumored that discussions are taking place on possibility of merging Pioneer Air Lines with Continental. . . . American Airlines has offered to carry first class mail on its New York to L. A. route for a test period of one year at the rate of 25 cents per ton-mile. The Airlines Cargo Advisory Board has not reached a final agreement on proposed rates for carriage of first class mail. . . . The P. O. Department has been studying the proposition of carrying all first class mail by air and has taken the American offer under advisement.

A TRANS-ATLANTIC ROUND TRIP IN A 90-HP. LUSCOMBE was completed in July by Peter Gluckman, a watchmaker of San Mateo, California. Seemingly unconcerned, Gluckman left San Francisco on June 6 in his 2-place Luscombe for London to see his mother, flying via Iceland. He returned the same way, landing at San Francisco on July 26—still seemingly unconcerned after crossing the Atlantic both directions in the little Silvaire with its 4-cylinder Continental engine.

BEN BRANSOM, executive pilot for Burrus Mills of Dallas for the last 18 years and one of the Southwest's best known old-timers in aviation, is now in business for himself as direct dealer for the Riley Twin Navion Conversion at Dallas on Love Field. Ben began flying in 1923, buying a war-surplus Jenny for $375 and then learning to fly it at Ft. Worth. He began flying for Jack Burrus on Aug. 1, 1935. Burrus executive ships he had flown during the 18 years which followed included a tri-motor Ford, 2 Beech stagger-wings, a cabin Waco, Lockheed 12, DC-3, and Grumman Mallard. Burrus also has a Riley Twin Navion Conversion. In 1941, Ben was given leave of absence to join Lockheed's ferry service. He became a Lockheed test pilot at Burbank and later at Lockheed's modification center in Dallas, where he became chief test pilot before the war ended. Bransom is enthusiastic over his new work and says the Riley Twin is "a natural" from all standpoints. W. E. Marr is Burrus Mills' new pilot.

PAUL MAC CREADY OF LOS ANGELES WON THE 20TH NATIONAL SOARING COMPETITION at Elmira, New York, last month, flying a newly-developed Schweizer 1-23D long-wing. His point total was 1,889. Second with 1,677 points in a Schweizer 1-21 was Stan Smith of Buffalo, and Paul Schweizer was third with 1,574 points in his 1-23D. Next three places went to Steve Bennis of Long Island, N. Y., in a 1-23D with 1,506 points, RAF Wing Commander Nick Goodhart of Washington, D. C., with 1,279 points in a Laister-Kaufman, and Bill Coverdale of Chattanooga in a 1-23 with 1,170 points. Betsy Woodward of Washington, D. C., flying a 1-23D, retained

FLIGHT RESEARCH WITH SUPERSONIC PROPELLERS is being conducted by McDonnell Aircraft Corporation at St. Louis with its XF-88, equipped with an XT-38 Allison turbo jet in the nose in addition to its regular power plant installation of two Westinghouse J-34 jets. Take-off with prop feathered is shown. Project is under USAF propeller laboratory working with McDonnell, NACA and the Navy.
—(McDonnell Aircraft Photo.)

the national women's title. Thirty sailplanes—five of them the new Schweizer long-wings—took part, with 28 competing pilots. Jon Carsey, Dallas architect, was reelected president of the Soaring Society of America, and E. J. Reeves, Dallas insurance executive, was elected treasurer. They reported Schweizer is readying a new 2-place high-performance sailplane, the 2-25 The Society voted to take part in next year's international contests to be held in England.

RECORD NATIONAL AIR SHOW ATTENDANCE is expected Sept. 5-7 at Dayton, Ohio, home town of the Wright Brothers. Over thirty of America's leading aircraft manufacturers will participate, along with the military services, in an elaborate static and flying display commemorating the 50th anniversary of powered flight. The big show replaces the National Air Races formerly held over the Labor Day weekend. Ben Franklin is in charge.

Airmen's Calendar

Aug. 26—CAP Workshop Classes, University of Colorado.

Aug. 20-23—Air Force Association's 7th Annual Convention, Statler Hotel, Washington, D. C.

Sept. 5-7—National Aircraft Show and 50th Anniversary of Powered Flight, Dayton (Ohio) Municipal Airport.

Sept. 7—Airport Dedication, Air Display, Fly-In Breakfast and 50th Anniversary of Powered Flight, Ponca City, Oklahoma.

Sept. 22-24—Aircraft Sparkplug and Ignition Conference, Champion Sparkplug Co., Toledo, Ohio.

Sept. 27-29—International Northwest Aviation Council's 17th Annual Conference, Gearhart, Oregon.

Sept. 29-Oct. 3—SAE Aeronautic Meeting, Hotel Statler, Los Angeles.

Oct. 10-17—Fifth Annual All-Texas Air Tour, 3,000 miles with 40 stops.

NEWEST SERVICE HANGAR ON LOVE FIELD in Dallas has been opened by Mustang Aviation, Inc., which continues to operate Mustang Airport in Dallas but has centered sales and service at Love Field. Mustang Operator J. O. (Toots) Womack and his wife, Paula, are shown at left with J. R. Cobb (center), pilot for Penrod Drilling Co., who frequently uses Mustang air taxi service for his executives. Mustang has signed interchange agreements with 17 airlines for its air taxi service, approved by the Air Traffic Conference of America, a division of the Air Transport Association. Womack's new Love Field operation includes a hangar with 8,000 sq. ft. of space and a separate pilots lounge, sales office and parts department consisting of 2,000 sq. ft.
—(Tom W. Collins Photos.)

PERSONAL NOTES: New Air Force Deputy Assistant for civil aviation matters is Bradley D. Nash, who replaces Milton (Putt) Turner, resigned. . . . Charles Dearing, former transportation expert for the Brookings Institution, has been appointed deputy undersecretary of Commerce for transportation, replacing the late Ray Kirchner.

Horace Boren, news bureau chief of Braniff International Airways, last month flew **AROUND THE WORLD IN 99 HOURS AND 16 MINUTES** to set a new world record for circumnavigating the globe by commercial airline. The trip was made to spotlight Braniff's 25th anniversary and in Boren's own words, "to let people know that anybody with $1,700 can make the same flight on regularly scheduled services." Boren used TWA from New York to London, picked up the BOAC de Havilland Comet flight from London to Tokyo and Northwest Airlines from Tokyo back to New York.

FIRST FIVE WINNERS OF LAST MONTH'S 7TH ANNUAL ALL-WOMEN'S TRANSCONTINENTAL AIR RACE, sponsored by the Ninety-Nines, were: 1st, Frances Bera and Marcella Duke of Inglewood, Calif., Stinson Voyager, 21 hrs. 53 mins.; 2nd, Jean Parker of Arcadia, Calif., Cessna 140; 3rd, Doris Johnson Eacret of Elko, Nevada, Cessna 140A; 4th, Virginia Stover Richardson of Yakima, Wash., Cessna 140, and 5th, Pauline Glasson, Corpus Christi, Tex. The race was East-West, from Lawrence, Mass., to Long Beach, Calif.

★ ★ ★

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In Cleveland it's AERO-WAYS

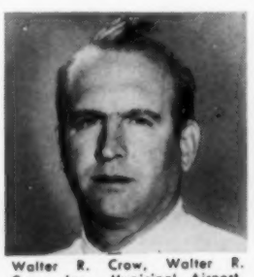
AERO-WAYS, INC., under the capable direction of president Ted Byron, has been a leader in the field of aviation for nearly a quarter of a century. The modern Aero-Ways shops are manned by veteran aircraft personnel. A factory distributor for most nationally advertised aviation products, Aero-Ways received the Department of Commerce citation for having the first model "aviation store."

T. E. "Ted" Byron, Aero-Ways, Inc., Municipal Airport, Cleveland, Ohio.

H. Warren Halladay, Stannell and Halladay, Washington, National Airport, Washington, D. C.

Don Pennington, Carolina Aero Company, Municipal Airport, Asheville, North Carolina.

George Harte, Harte Flying Service Municipal Airport, Wichita, Kansas.



Walter R. Crow, Walter R. Crow, Inc., Municipal Airport, Toledo, Ohio.

B. G. Vandre, Van's Air Service, Municipal Airport, St. Cloud, Minnesota.

C. W. "Wayne" Crussell, Southern Aero, Inc., Municipal Airport, Atlanta, Georgia.

Cheston M. "Chet" Newhall, The Babb Co. (Canada) Ltd., Montreal Airport, Dorval, P.Q.

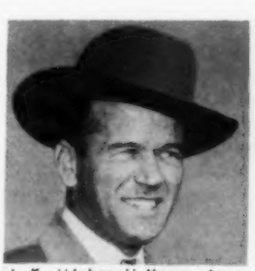
Art Meurer, Arthur Meurer Co., Inc., LaGuardia Field, New York, N. Y.

I. H. "Monty" Montgomery, National Aero Sales Corp., Midway Airport, Chicago, Ill.

Dan Hood, Air Sales and Service Company, Wier Cook Municipal Airport, Indianapolis, Indiana.

H. William "Bill" Blake, Sales Manager, Washington Aircraft and Transport, Boeing Field, Seattle, Washington.

Fred Smith, Sales Manager, AiResearch Aviation Service Co., 5907 W. Imperial Highway, Los Angeles 45, California.



J. K. "Johnny" Hamp, Aero Sales Division, Houston Transportation Co., Municipal Airport, Houston, Texas.

Cy Willock, Sales Manager, Dowtown Air-Park, Inc., 1800 South Western, Oklahoma City, Oklahoma.

H. Leibee Wheeler, Buffalo Aeronautical Corporation, Buffalo Municipal Airport, Buffalo, New York.

AERO DESIGN Commander

AERO DESIGN AND ENGINEERING COMPANY

TULSAKES AIRPORT • OKLAHOMA CITY, OKLAHOMA

HELICOPTER OUTLOOK

(Continued from page 25)

servicing on rooftops and that hazards involved may make some buildings unsuitable. But heliports located on roofs of auto parking garages should not create any special problems. It was felt that mobile tankers would be preferable to fixed-point fueling facilities until more operating experience has been gained. In discussing rooftop heliports, they were seen as eliminating high ground costs, they are comparatively free from nuisances and they provide ready-made altitude to the pilot. Buildings of only three or four stories would be preferable, since they are low enough to allow the pilot to come in under the weather. If owned or operated by the carrier, the building might also produce revenue from its office floors.

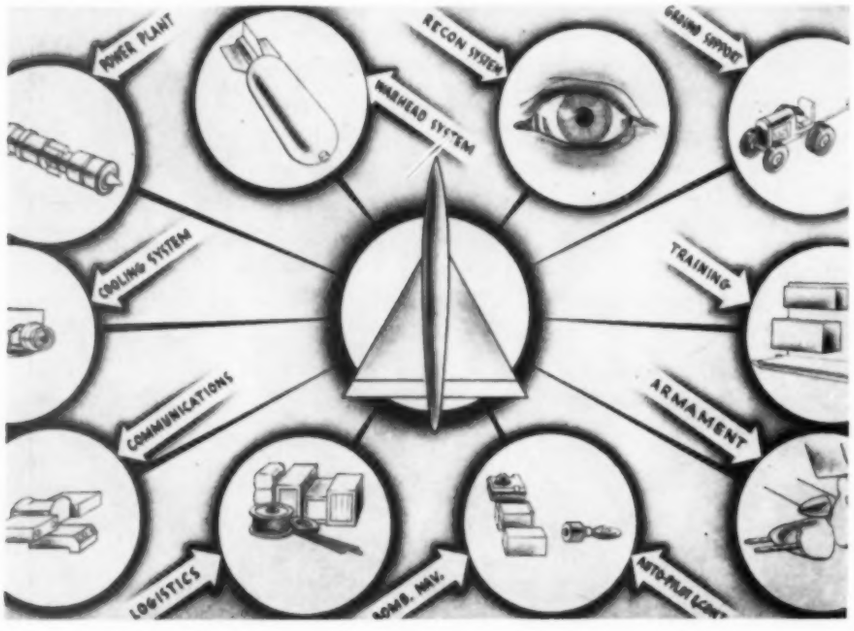
Mail is not now being carried directly to the main post office in New York because its roof requires strengthening at a substantial cost. But planning indicates it is practical to strengthen roofs of many existing buildings. One specification calls for reinforcing the roof to withstand 4G vertical and 3G lateral stress, considered generous by some operators. Cost estimates for roof strengthening of three existing buildings for heliports were cited; in two cases, only 2 per cent was added to the over-all cost, and in the third, 10 per cent.

ECONOMICS: European operators felt they might lose money for several years but that the services would eventually become profitable. Circumstances dictate they concentrate on passenger operations primarily, the economics of inter-city helicopter bus service being expected to run about the same as those of DC-3 service. Metropolitan operators said their costs are in the range of local feeder service operators, but they are limited now by lack of navigation facilities and weather information. One operator said his utilization rate is now about 8 hours daily but he hoped to raise to 10 or 12, depending on whether new machines can be made more easily accessible for repairs and component changes.

It was agreed by present and prospective operators that helicopters have a valuable service to render the public for which premium prices can be charged. In Europe, it was estimated cost of helicopter transport will be as high or somewhat higher than the combination of existing first-class air fares and city-to-airport limousines on a given route. Metropolitan operators indicated they might use a tapered fare structure. Where their services covered routes competitive with cabs, they might charge the same fares of 25 to 35 cents per mile, while on longer routes the charge might go down to 10 cents per mile. At the same time, it was felt that convenience, rather than cost per mile, may well be the determining factor in setting fare levels. Incidentally, passenger helicopters will have other revenue sources, such as sight-seeing.

Manufacturers pointed out that as helicopters become larger, the comparative weight of rotor blades and transmission gear increases considerably at the expense of payload. It was suggested that the optimum economic weight of a helicopter using gear transmission is between 20,000 and 60,000 lbs. gross weight, and that operators might be well advised to keep the equipment within this limit.

It was felt that operating experience is lacking to develop a separate formula from the one now used for fixed-wing aircraft for deriving helicopter operating costs, although it has



New Weapons System for Supersonic Bomber

THE delta-wing aircraft sketched in the center of the drawing above is a long-range, supersonic heavy bomber which Convair is developing for the U. S. Air Force. The symbols which surround it represent a multitude of equipment without which combat aircraft development could not be complete. Each of the items is a far-reaching project in itself.

All this has been grouped in the picture to illustrate a new USAF-Convair concept called "Weapons System Management." Objective of the new plan is to speed development of the new aircraft, get it into production sooner and effect economy by shortening the lead time for development through more efficient management.

Under conventional military aircraft development programs, the Air Force develops or procures the majority of equipment and then supplies it to the prime aircraft contractor — each article a complete item ready to hang onto the airframe. More often than not, the contractor has to string together individual items "tinker-toy" fashion to create the bombing system peculiar to his type of aircraft and when one item is not compatible with others, compromises result which affect the performance of the over-all weapon system involved.

Says August C. Esenwein, Convair's Fort Worth manager: "With supersonic flight, these disparities become more acute until we find we simply can not attain the required performance with such compromises." He said conventional methods also have diverse Air Force agencies serving as coordinators between the Air Force, the many suppliers and the prime contractor — involving conferences, compromises and delays in approvals. But under the new concept, a new relationship between the Air Force and the prime contractor is achieved and both assume co-equal stature — Convair holding centralized responsibility for coordinating and managing the performance of the entire project and the Air Force channeling all of its requirements, decisions, resources and support into a "joint project office." Thus the idea is to break the log jam so supersonic heavy bombers can be rushed into production in the race for air supremacy being waged with Russia. ★ ★ ★

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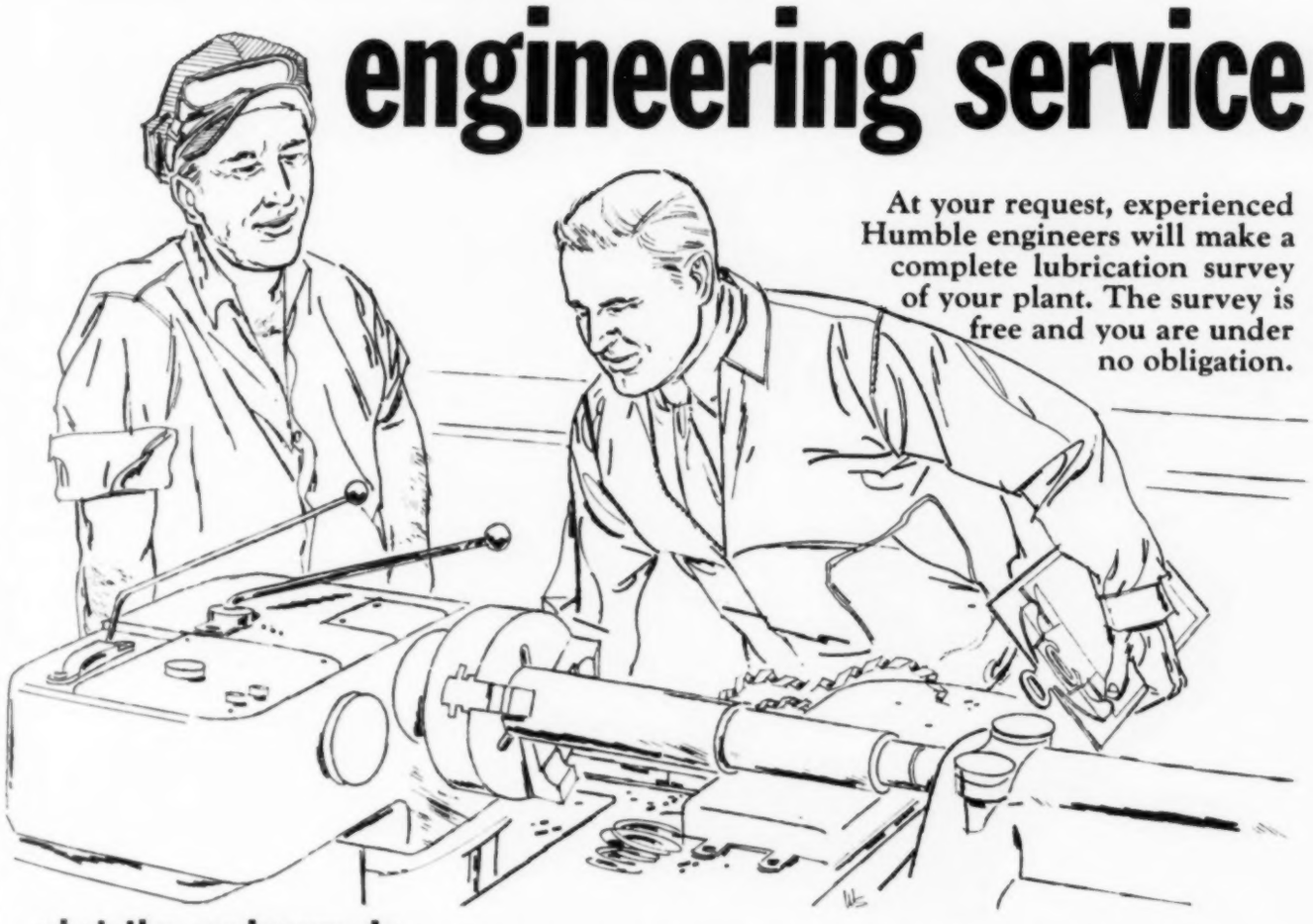

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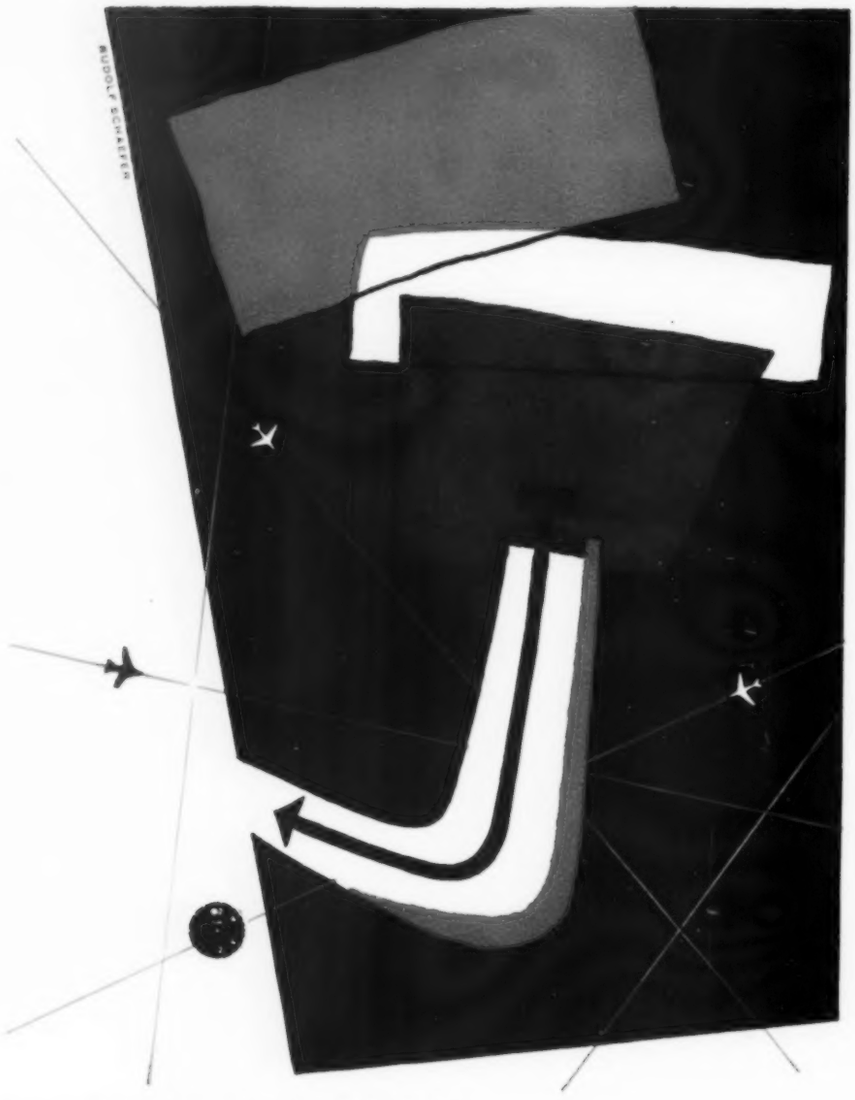

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already been necessary to overhaul the Air Transport Association formula as regards maintenance and overhaul. U. S. operators have found their ratio of man-hours of maintenance and overhaul to hours of flight is now running about 5 to 1 and hope that this will be reduced to 4 to 1 when larger helicopters are introduced.

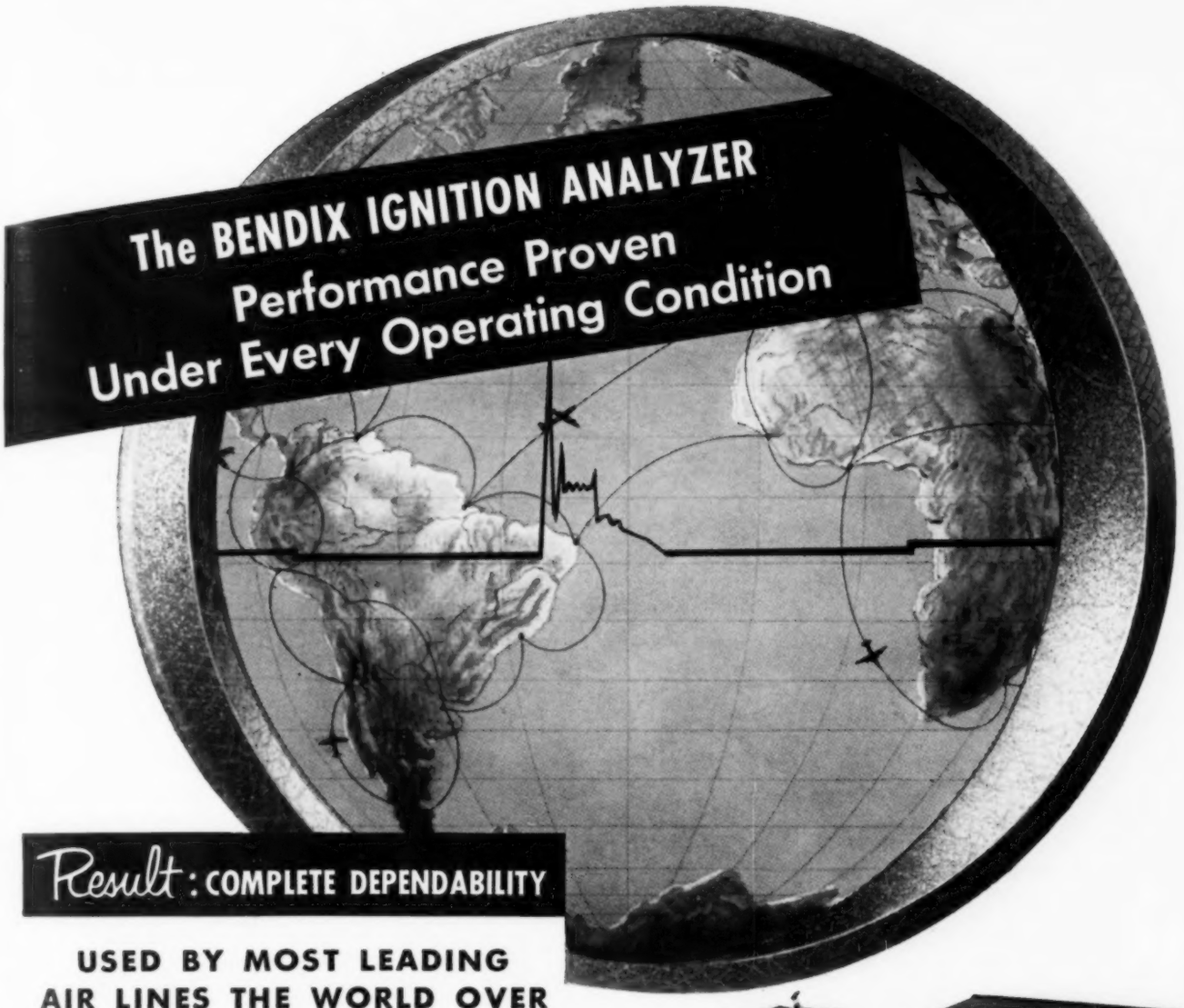
Higher costs have been found in the maintenance of transmission, rotor heads and rotor blades due to design changes. It was suggested that a fundamental rotor-craft characteristic is the fact that a helicopter will likely wear out several sets of gears and transmissions during its lifetime, although it is not now possible to say how long this operating lifetime might be. Some concern was expressed about the fatigue life of components, especially rotor blades. United Kingdom regulations on this are severe. Fineness of design and lightness of parts may make for higher initial payloads, but they increase maintenance costs. The feeling was that much more requires to be known about the economic, operating and maintenance characteristics of the transport helicopter and this can only be gained through actual experience. It was therefore suggested that governments sponsor a program of accelerated service testing of prototypes in simulated airline operation.

In a discussion of costs, it was pointed out that there is more machinery in a helicopter than in a fixed-wing aircraft. Initial costs of rotor aircraft will likely be higher in early stages than with fixed-wing aircraft, especially when few units are produced, but the cost differential may come down with volume output. In computing these costs, it was said that airframe and engine and installation costs are about the same as for fixed-wing, while gearbox and transmission have the same cost per pound as engines and rotor blades cost about the same per pound as propellers.

Hopes were expressed that insurance rates will eventually be lower than those for fixed-wing aircraft, especially when multi-engine helicopters are introduced, because the risks attendant upon take-off and landing will be further diminished. These rates are now higher, largely because there are so few operators in the business to provide good actuarial data. Rates are subject to strong fluctuations as the result of a single accident.

The helicopter was described as having had a higher accident rate but a lower fatality rate per accident than conventional aircraft. With twin-engine operation, the accident rate is expected to be considerably reduced.

★ ★ ★



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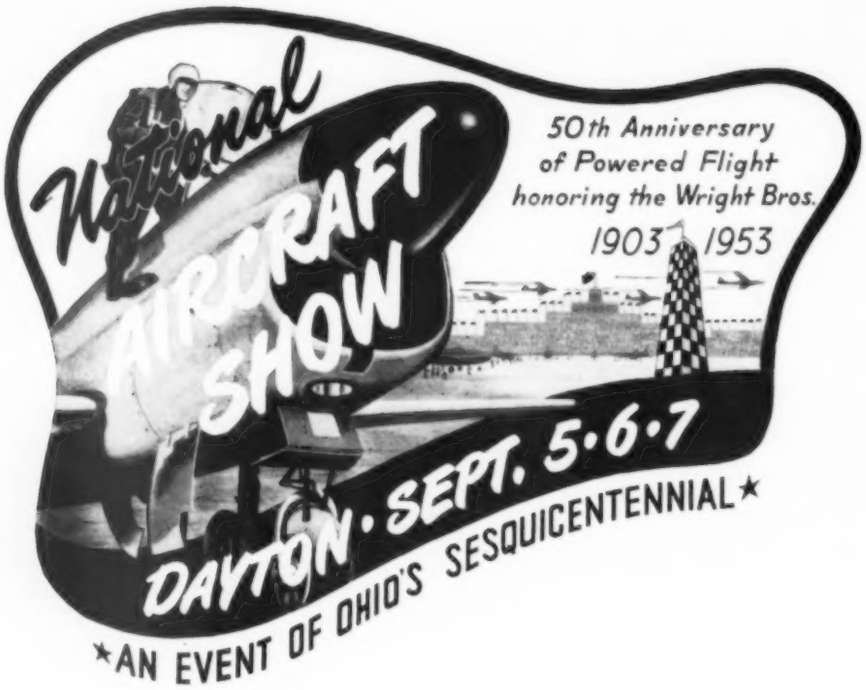

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FLIGHT SCHOOL

(Continued from page 21)

save every two-bits toward flight time; some are literally worth millions. The great bulk—nearly 75 per cent—are in the armed services or are employed at one of the many military posts and bases surrounding San Antonio. But only about half of them are flying under the GI Bill—the rest are cash customers.

The school averages about 500 hours of instruction per month on an annual basis. Occasionally this peaks 600 hours and more. In addition, over 100 hours of rentals are averaged monthly, along with about 25 hours of air taxi service.

The 21 airplanes used by the school offer a student an opportunity to learn about a lot of different airplanes, for included in the "fleet" are six J3 Cubs, 3 Aeronca Champions, 2 T-Craft's, 2 Cessna 140's, a Ryan PT-22, a Bellanca Cruisair, a Stinson Station Wagon, a Piper Tri-Pacer and a Twin Cessna. The first of possibly several Mooney 18's is on order. With this assortment, instruction is given for every rating except ATR.

Another ingredient in the Smith formula for success where so many have failed is a willingness and determination to work. Zeke and his wife are on tap from early morning until darkness and they make themselves busy throughout the day. The school has two full-time employes, who are both instructors and mechanics (Zeke himself is an A & E as well as an instructor). There are five part-time instructors and three part-time mechanics.

Smith does a small amount of advertising in the papers published at local military posts and airfields, but his principal sales tool is a satisfied student and a good reputation in local flying circles. Pilots of executive planes based in San Antonio frequently recommend the Smith Flying School—even, on occasion, to "bosses" whose desires to do some personal flying are whetted by frequent trips in their large transports. Smith's reputation reaches past the local flying circles. In far-off Uruguay, Enrique Flores talked about flying with the pilot of an executive airplane visiting there from San Antonio; this summer, Enrique is completing an instrument course at the little Smith Flying School.

From the standpoint of basic philosophy, Smith emphasizes flying proficiency—technique—more than cross-country work. Smith feels that this pays off and points out that his stu-

(Continued on page 47)

JUST AMONG OURSELVES

(Continued from page 13)

time and energy to work over the professional pilot who is caught between the boss and the service institution, or the operator who is caught between an economy-minded pilot and, say, the municipality that owns the airport and demands its pound of flesh.

Actually the business flier or owner is mighty well off. Constantly improved servicing and maintenance facilities are one of the real tangible aviation accomplishments in the post-war era. The reason for this happy state of affairs is purely an economic one — as more people fly more airplanes, more and better servicing and overhaul and hangar facilities are created to supply the demand. The situation today is a far cry from what we knew before World War II. There will always be a certain percentage of chiselers among the customers and a certain percentage of rotten operators. The former are self-liquidating and the latter are taken care of by the inexorable laws of economics. About the only room for improvement is a better understanding of safety being a dollar mark on the part of some corporate executives. And that shouldn't be too difficult a job. ★ ★ ★

HIGHWAY PATROL

(Continued from page 19)

lenged, the courts have upheld the flying troopers. Few people care to challenge, however, once they are shown the airplane above them when the arrest is being made and then hear in detail exactly what they have been observed to do.

"Most people appreciate the thoroughness of our air patrol, recognizing it for the safety values it offers them as well as others," Waggoner explained. "After all, it is accident prevention we're after. It is axiomatic that the fewer traffic violations we have, the fewer accidents there will be. After seven years of flying highway traffic we are convinced we have made Missouri highways safer and their users more safety-minded."

The Colonel, as progressive and alert as they come, had been a trooper since 1937 when appointed superintendent of the department in 1945. He was only 33 years old then — the youngest state police superintendent in the country. Except for a brief period during 1949-51 when he took leave to serve with the National Safety Council as Midwest representative working in the interests of uniform laws, he has served in the same position

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ever since, establishing many improvements. Testimony of his success came recently when his personnel was increased to 320 and salary raises were authorized for troopers. Because of their record, Missouri is proud of its State Highway Patrol and it maintains standards definitely above the average. Having been a police reporter years ago, we were quick to recognize evidences of this among the troopers and operations we saw. Proof of superior effectiveness is the use of aircraft in traffic work; this alone distinguishes Missouri and a few other states for top-notch police effectiveness.

We wondered where Waggoner got his ideas for the air patrol — who sold him? Pointing to Lieutenant Barton and Sergeant Hugh Wallace, he said: "We sold ourselves in 1946 and bought some surplus L-5's to try it out — it worked." Both pilots, they helped Waggoner plan the air patrol. Wallace, who now flies the department's Cessna 190 mostly for personnel transportation, had been in civilian flying since 1937, serving as an instructor at Kansas City in Charlie Toth's Civilian Pilot Training-War Training Service program. A third pilot in the highway patrol is Trooper Bud Jones, who joined the state police after flying for J. Raymond Brummet's "BACA Airlines" at Jefferson City.

Exploits by this three-plane "air force" have been many and varied. Highway traffic control is their chief assignment. From the air they not only spot and pull out of the traffic those who are in violation but they can observe and direct the flow of traffic around bottlenecks, survey road conditions and coordinate ground activities, especially in emergencies such as accidents and disasters. Barton once landed his patrol airplane in a farm field adjacent to a wreck on the highway, walked over and directed traffic until patrol cars arrived to answer his radio call.

Catching Fugitives from Air

Apprehension of fugitives has been aided materially by the work of the patrol aircraft. In a bank robbery recently, the FBI credited Barton's flying as having led to the solution. Within 30 minutes after the hold-up, the flying trooper spotted the getaway car, which had been abandoned off the highway in some brush 5 miles from the scene. By radio he had a ground crew at the abandoned car within 2 minutes after it was spotted. They found evidence in the vehicle which led to arrests that night and recovery of the bank's stolen money. Colonel Waggoner's Cessnas also haul bloodhounds to the scene of crimes, transport prisoners and rush evidence from laboratories to courts. In every case of prisoner escape where the patrol has used an airplane, the fugitive has been captured — knowledge of this record now discourages escape attempts at the state prison.

"I have even captured fugitives from the air," Barton recalled to further explain the usefulness of airplanes in state police work. In one such capture, Barton saw the escaped convict run into a wooded area. He circled the spot endlessly, now and then diving on it. Eventually the fugitive ran out onto the highway, threw down a gun he was carrying, and held up his hands to signal to Barton that he was giving up. A patrol car soon arrived to take over while Barton circled, holding the convict at bay. "He said he knew there was no use in hiding because I would get him when he came out anyway," Barton said.

Another time a manhunt ended when Warden Ralph Eilson, riding in Barton's plane, shot at an armed fugitive who had just shot a trooper during a chase. The convict hit the dirt and was taken into custody by other troopers on the ground, saying he had been shot from the air. But the bullet from the plane had not actually struck the fugitive — it had kicked up a rock which did hit the man's heel with

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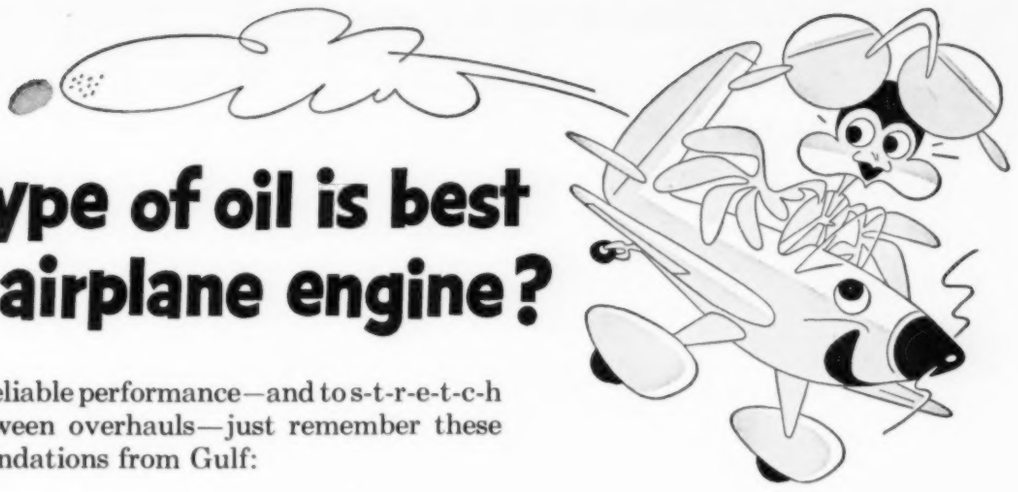

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such force he thought he had been shot.

Public Welfare Services

A little girl lost for two days was spotted from one of the Missouri State Highway Patrol planes and returned to her parents. Missing fishermen's bodies were located once the air patrol had spotted their boat, which had submerged in a storm and then drifted into the bank at a spot unseen except from the air. One of the police planes saved a baby's life when the pilot rushed the infant 90 miles to a hospital in Kansas City for an emergency throat operation. During the 1951-52 floods at Kansas City, the patrol planes flew 200 hours on emergency duty watching for levee breaks, spotting marooned families and livestock, and directing rescue work from the air.

The record is seemingly endless — a vivid portrayal of police aircraft usefulness in serving and protecting society by improving the effectiveness of the Missouri State Highway Patrol. Colonel Waggoner and his flying troopers operate their three airplanes as regular equipment, right along with the patrol cars, the radio and teletypewriter network, the crime laboratory, and the many modern devices required by police activity today. Their airplanes have never figured in an accident yet, and the pilots attribute this not only to common-sense utilization but to strict adherence to factory - recommended maintenance. The organization has 9 zones or areas throughout the state and if the budget were sufficient, one airplane based in each area would be the minimum.

Colonel Waggoner sees his 7-year-old air patrol as a stepping stone to what can be accomplished in the future. He expects to hold traffic accidents and violations to lower and lower minimums, especially when more airplanes can be put to work and, perhaps, helicopters or eventually convertaplanes.

"I would like to see other states develop air patrols and our experience is available to any of them at any time," he says. "We can reduce highway accidents. We can make more effective use of limited but more highly qualified executive personnel in lifting the standards of law enforcement. And at the same time we can save lives and alleviate suffering in emergencies and improve our services in the interests of civilian defense. Properly-equipped, trained and utilized state police air patrols should be the objective of every state interested in effective law enforcement and the promotion of public welfare." ★ ★ ★

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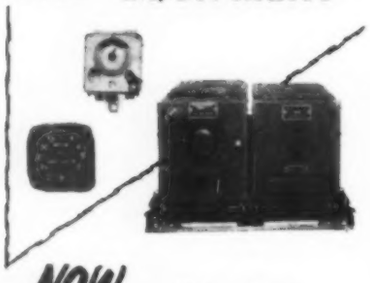

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REVENUE TO AIRPORT FROM FARM MACHINERY DEVELOPMENTAL PROGRAM is reported from Lancaster, Pennsylvania's municipal airport. Last year sale of hay from 169 acres of airport grass netted $1,200. Grass area is used by neighboring New Holland Machine Co., farm machinery manufacturer. This year's harvest is expected to net larger returns as a result of New Holland's development program.

Questions and Answers for Airport Operators

Getting Along With Fixed-Base Operators

QUESTION: I have been an airport manager only for a comparatively short time, but I have a background of flying which I had thought would enable me to grasp the details of the job quickly enough so that by this time everything would be running smoothly. Everything is, for the most part, but I have one sore spot. The fixed-base operators simply won't try to get along with me. They resent every move I make, even when it has nothing to do with general aviation. I've fallen down, apparently, in fundamental public relations and for the life of me I don't know why. The latest beef lies in my raising the rent of the restaurant concession. Why should the operators care about that?

ANSWER: Perhaps it does seem strange to you that the operators concern themselves with arrangements with your restaurant concession. But we believe there is a valid reason for their concern.

First, however, let's look at your airport as a whole. It's a typical airline stop using a public airport and serving just under a half million people. It has a number of fixed-base operators renting publicly-owned hangars in some cases and in others using privately-owned structures. There are several airlines serving your community including a local service airline. There's a fairly adequate terminal building with restaurant, newsstand, barber shop and airline and other offices. You even have some non-aeronautical tenants.

Each of your airport tenants and users has a different function in the airport's general purpose. But each contributes a part of the services that go to make the airport a well-rounded success for the community. The types of tenants are not generally in competition with each other, although among the various members of each type there may be intense competition.

On the other hand each supplements the other and together they produce

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AIRPLANES ARE PLANT EQUIPMENT FOR THE MALL TOOL COMPANY'S CHICAGO PLANT, which operates the aircraft shown above — two Beechcraft D18S transports, a Navion and a Republic Seabee. The Twins are used for trouble-shooting among Mall's 40 factory-owned service branches and to fly in new products. The Navion is for shorter-range business trips such as sales trips in radius of 400 miles. The Seabee carries technicians and equipment into remote wilderness areas where Mall chain saws are operated. Recently when a railroad strike threatened production from treated aluminum die castings, one of the Beechcrafts rushed 1,000 lbs. of untreated castings to New York where they were treated overnight and returned next morning to assure continued plant production.

the pulling power which enables each to do enough business to pay you in rentals and charges those revenues you require to support the field.

There is a tendency in many communities for public officials to look only at scheduled services as the main concern of the airport. We don't believe most trunk and local airlines foster that view, but we do believe it springs from public reaction to anything which might affect scheduled services. That's understandable. However, the operators perform a public service also in the products and services they sell. The concessionnaire provides a service for the public and for the other elements on the airport.

If you injure or eliminate any one of the aeronautical or non-aeronautical elements, the whole operation becomes weaker. That's why your operators are concerned by your raising the restaurant rent.

If your tenant has too tough a time of it, he may quit and that affects the operators and their employes and customers. Operators may gripe when coffee goes to a dime but they know a good restaurant brings them transient business.

If for some reason your airlines were to leave the airport, the operators would suffer. First, because the people who come to the airport to travel by air or to meet such travelers are potential and actual customers of the other services. Second, with the airlines gone and the resultant revenue reduction, some public agencies tend to think the function of the field is gone.

Then there may be a fear on the part of the operators that your raising one tenant's rent is just a forerunner for a general raising of fees and charges all across the board. One thing you may be sure of—your operators probably know more about the affairs and the finances of your tenants than you do.

We think there's a remedy for your troubles. It's simple. Get acquainted with your operators. Don't expect them to come into your office. Get out and follow the hangar line. Sit with

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N1522V, mfgrs. serial 48430. All fabric surfaces freshly recovered. Engines and accessories with low time since overhaul. 1842 hours total time, 344 since Navy overhaul on airframe, engines and propellers. Has A3A autopilot, thermal deicing, military interior. Aircraft will be checked and serviced for ferry flight. Flyaway Linden, N. J.

N4855V, mfgrs. serial 46477. Has thermal deicing, Sperry Mk. III autopilot, standard military interior. 2409 total hours, 616 since Navy overhaul on airframe, engines and propellers. Flyaway Burbank, Cal.

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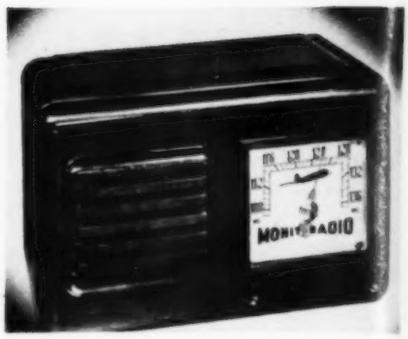


TUNABLE VHF RECEIVER for office, hangar or home receives aircraft and radio range communications. It is the Monitoradio, available for 108-136-mc. band and for 118-149-mc. band. Air Associates is distributor.

them and learn to know their problems. They have plenty of them. Don't be just a hand-shaker. Sincerely try to know the operators' viewpoint. Operators are going to be with you a long time—you should hope.

★ ★ ★

We enjoyed a right neighborly letter from Dr. Leslie Bryan of the University of Illinois at Urbana a few weeks ago. In part, he refers to the bird remedy we offered in our June column and avers he'll give it a try. Let us know, Les, how it works out for you. And that goes for anyone else. We'd like to know what luck you have.

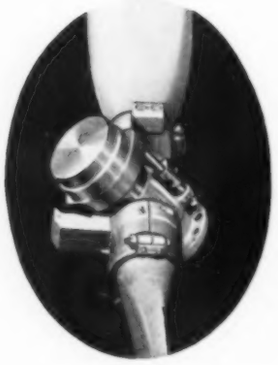
★ ★ ★

Incidentally, we've come to the conclusion that a lot of airport managers have broken their writing arms. We've been getting only a modicum of questions lately. If we don't get a good supply of questions on airports we'll have to open the column to the lovelorn and we've had no experience in that line.

★ ★ ★

a HARTZELL constant-speed propeller was Cessna's choice for their 180

A Hartzell constant-speed propeller is standard equipment on the Cessna 180.



Simplicity of design insures trouble-free operation with minimum maintenance.

The phenomenal climb and cruise performance obtained from such airplanes as the Cessna Model 180 results from excellent airframe engineering and provision for maximum *thrust*. Not only is *all* the engine power made available by virtue of the Hartzell constant-speed propeller, but it is converted into the highest thrust power possible by efficient Hartzell metal blades. Simplicity, low cost, minimum maintenance and low weight are other virtues of the new Hartzell Model HC-82-X constant-speed propellers. Full-feathering constant-speed propellers for light twin-engine aircraft are also available. Write for details.

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FAIRCHILD LARK is shown being launched from the Navy's guided missile ship, the Norton Sound. Larks are being flown by all three branches of the armed services in training and evaluation programs. Booster rockets fall off after the launching and the missile's own rocket motors then take over.
—(Fairchild Photo.)

FLIGHT SCHOOL

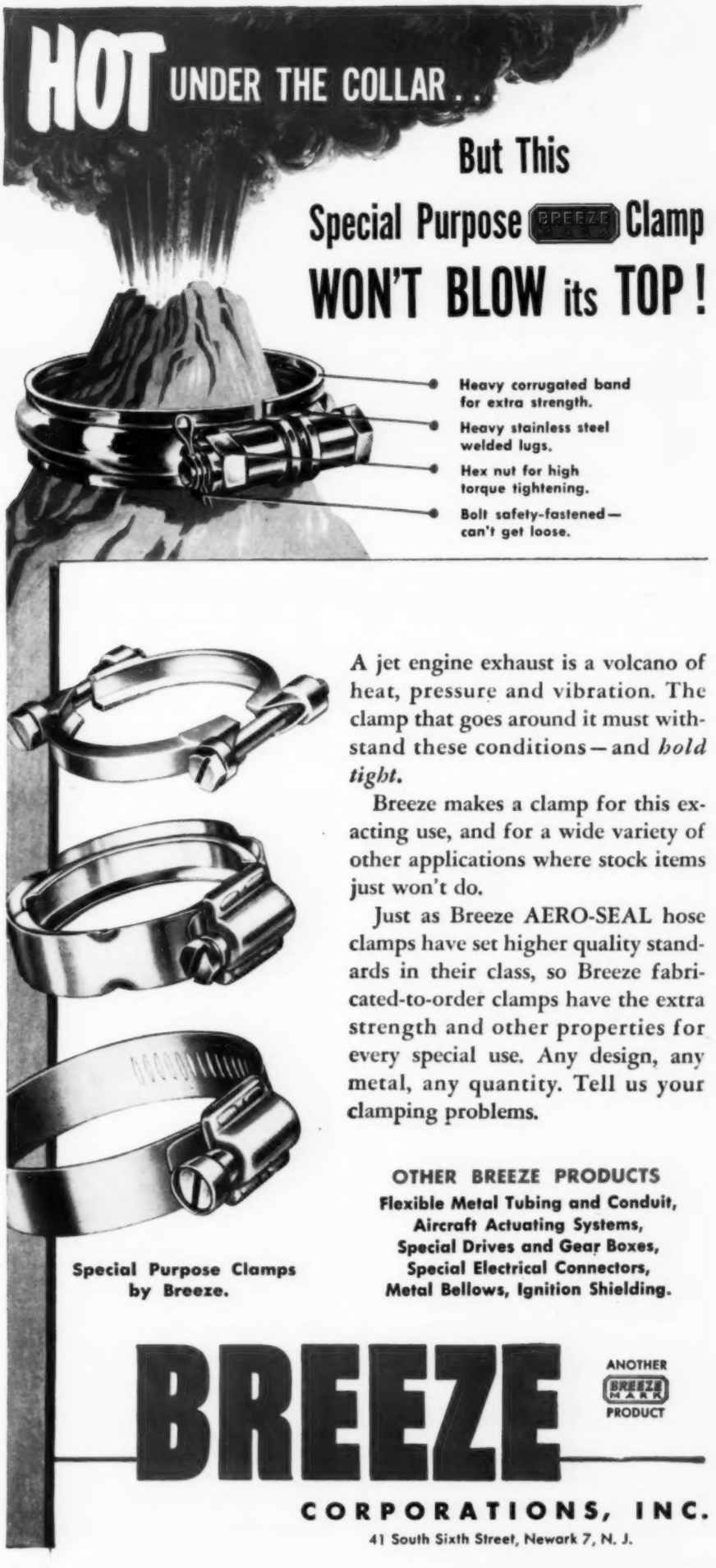
(Continued from page 36)

dents have had but two actual forced landings in his equipment, both resulting from carburetor icing. One was by a student with less than 40 minutes of solo time. Neither resulted in any damage.

Only three times has a Smith airplane been damaged by his students. Each time it was by a student who had started his instruction elsewhere on a big airport. By no stretch of the imagination could Davis Airport be called "big." Its longest strip is 2,550 ft. of bulldozed dirt that curves over the top of a hill. Technique, says Zeke, doesn't come so easy from big, concrete airports.

Smith Flying School doesn't go in for modern architecture, landscaping, plush furnishings or country-clubbing. Lean-to hangars, cement block office badly in need of paint, weeds and dust and a bench and some empty oil drums are the vogue. If anything, the students seem to prefer it this way, for they gather every day for hangar-flying sessions while waiting their turn in the air. But it is all flying at Davis Airport, for Smith stays strictly away from selling or brokering airplanes. Zeke won't even allow a plane to be sold off his field—unless he is personally satisfied that the plane is honestly appraised by the seller.

Weekends often see a group of his students off on an early breakfast flight to a not-too-distant Uvalde or Austin. The breakfast is on Smith, who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FIRST OF THE NAVY'S NEW GOODYEAR ZP2N NON-RIGID AIRSHIPS is shown on its acceptance flight before delivery to the fleet. The new type is more than 300 ft. long, has helium gas capacity of 975,000 cu. ft., and is designed for latest developments for locating and attacking enemy submarines. It can refuel from surface vessels at sea and can re-ballast in flight by taking on sea water.
(Goodyear Photo.)

phones ahead to make certain everything will be ready. If quickly handled, the planes are soon in the air again and back at Davis Airport for a day of instruction.

To Zeke Smith, flying is something very ordinary but always enjoyable and never spectacular or hazardous. It is this feeling that he succeeds in passing on to his students—this is one of the factors in his success with students. He never permits a student to be scared by violent maneuvers in his early stages. When a student "transfers" to Smith from elsewhere, or an already licensed pilot seeks to rent a plane from the school, Smith give him a thorough check ride. Those that tend to be spectacular—the aerial cowboys—are politely told to try somewhere else. As a result of this philosophy, Smith has a high percentage of students in the "Serutan set"—over 35—some of whom had been turne against flying in earlier years by "superman" type of instructor.

Does Smith's formula pay off? Well, Zeke and his wife have run a $37 stake up to $35,000 in only three years. They are both busy and happy—and more optimistic than ever. Their nearly-new Cadillac is paid for, as are eighteen of their airplanes. ★ ★ ★

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WE-1 NAVION

(*Continued from page 23*)

"Minimum weight" of 2,908 lbs. is with pilot and 1 gal. of fuel for each 12 hp. of maximum continuous rated power, 1 gal. of oil for each 25 gals. of useable fuel or each 75 hp., whichever is greater, as outlined in Civil Air Regulations Part 03.

The converted airplane's power loading is 8.65 lbs. per horsepower and its wing loading is 21.1 lbs. per sq. ft.

White said the company is investigating the possibilities of producing the WE-1 conversion for the market. They are reluctant to discuss costs for production conversions until all their certification and cost estimate figures are completed, but they acknowledge that it will probably cost "more than $30,000" plus the single-engine Navion to be converted. Although no orders will be sought until CAA certification is completed, the prototype is to be flown on a 4,000-mile cross-country demonstration tour. "After all," one of the White brothers remarked, "the proof of the pudding is what the WE-1 will do with others at the controls and not what we say." ★ ★ ★

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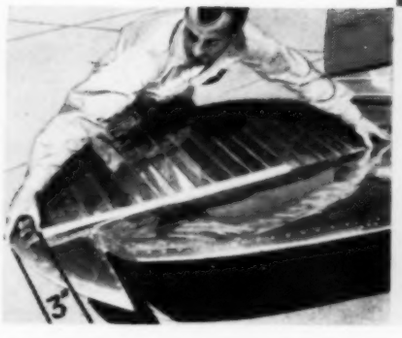

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